United States Court of Appeals

for the Second Circuit

APPENDIX

75-7048

UNITED STATES COURT OF APPEALS
FOR THE SECOND CIRCUIT
Case No. 75-7048

NATURAL RESOURCES DEFENSE COUNCIL, INC., ENVIRONMENTAL DEFENSE FUND, INC., THE LONG ISLAND SOUND TASKFORCE, THE FISHERS ISLAND CIVIC ASSOCIATION, INC., FISHERS ISLAND LOBSTERMEN'S ASSOCIATION, INC., CONNECTICUT CITIZENS ACTION GROUP, NORTH FORK ENVIRONMENTAL COUNCIL, INC., and THE LEAGUE OF WOMEN VOTERS OF RIVERHEAD-SOUTHOLD,

Plaintiffs-Appellants,

- and -

STATE OF NEW YORK,

Intervenor-Appellant,

- against -

HOWARD H. CALLAWAY, as Secretary of the Army; LT. GENERAL WILLIAM C. GRIBBLE, JR., as Chief of Engineers, United States Army; COLONEL JOHN H. MASON, as Division Engineer, New England Division, Corps of Engineers, United States Navy; J. WILLIAM MIDDENDORF, as Secretary of the Navy; CAPT. C.C. HEID, as Commanding Officer, Northern Division, Naval Facilities Engineering Command, Department of the Navy; RUSSELL E. TRAIN, as Administrator of the U.S. Environmental Protection Agency; and JOHN A.S. McGLENNON, as Regional Administrator, Region I, U.S. Environmental Protection Agency,

Defendants-Appellees.

APPENDIX
Volume 2
(Exhibits)

BP/s

DEPARTMENT OF JUSTICE
Land and Natural Resources Division
Appellate Section, Room 2338
Washington, D.C. 20530

Attorneys for Defendants-Appellees

Attorney General of the State of New York
Two World Trade Center
New York, New York 10047

Attorneys for Intervenor-Appellant

BERLE, BUTZEL & KASS
425 Park Avenue
New York, New York 10022

PARMELEE, JOHNSON & BOLLINGER
460 Summer Street
Stamford, Connecticut 06901

Attorneys for Plaintiffs-Appellants

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APPENDIX

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Defendants' Exhibits:

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Exh. A

June 20, 1973

Middle Atlantic Coastal Fisheries Center
Sandy Hook Laboratory
Highlands, New Jersey 07732

John B. Pearce, Chairman
Scientific Subcommittee on
Ocean Dredging

Subcommittee Meeting Held at Newark Airport, June 19, 1973

Mr. Russell T. Norris, Regional Director
Northeast Region
Federal Building
14 Elm Street
Gloucester, Massachusetts 01930

The subject meeting was called on Thursday, June 14, to discuss a problem the Corps of Engineers has had with regard to the disposal of sediments to be dredged by the U. S. Navy from the Thames River, New London, Connecticut. Mr. Vyto Andreliunas and Mr. Carl Hard represented the New England Division, Corps of Engineers. Dr. Jan Prager, Water Quality Laboratory, Narragansett, Rhode Island, and Dr. John Pearce represented the Scientific Subcommittee.

The Navy proposes to dredge 2.9 million cubic yards of sediments from a new submarine berthing area during a period of two years to commence in October of 1973. The Navy would presently be willing to barge these sediments some 50 miles to the Brenton Reef site, previously investigated by Dr. Saul Saila, University of Rhode Island.

A relatively short term study has been conducted by the Navy (NAVOCEANO TECH. NOTE NO. 7300-3-73) on a site immediately outside the mouth of the New London Harbor. Approximately 90 thousand cubic yards of spoils generated by maintenance dredging have been dumped at this site in recent months. The Corps of Engineers is technically responsible, under recent legislation, for delineating the dump site to be used by the Navy.

The Navy has indicated that it would consider dumping outside the waters separating Montauk Point from Block Island. In all instances, however, it would appear that the public and the fishing community might object to the establishment of any new dredge spoil disposal sites. Within the past two weeks the Navy had proposed so to have public hearings on the matter but apparently was encouraged by the New England Division, U. S. Army Corps of Engineers, to postpone any such hearing. During the subject meeting numerous suggestions were made as to how any sites would be selected and were there other alternatives to ocean dumping. Dr. Prager suggested that HUD was tentatively planning to develop new public housing in an area called Shaw's Cove outside of New London. The Corps representatives felt, however, that it would be impossible to use the spoils from the New London dredging since the Navy wishes to conduct its dredging in the immediate future and the HUD project is probably some years in the future.

Both Dr. Prager and Dr. Pearce suggested that the public, or at least segments of the interested public such as the fishing industry, municipal and state officials and members of various conservation agencies, be involved in the initial planning stages for future dredging and disposal activities.

Mr. Hard of the U. S. Army Corps of Engineers indicated that the Navy will have available substantial funds to support additional research at the New London site. Mr. Hard believes that a study of the hydrography in western Long Island Sound and Block Island Sound would be important for any future management decisions as to new dredge spoil areas.

Dr. Pearce developed a sequence of events which might allow the Navy to initiate their dredging activities on schedule, i.e. sometime in October or early November of 1973. First, the Navy would be authorized to dump at the existing dredge spoil site off the mouth of New London Harbor. The Navy is conducting a short term study at this site which indicates that the disposal activities, to date, have not caused significant damage in the area. Second, as soon as possible the Navy should begin a monitoring of the biological components, turbidity effects and effects of heavy metals and other toxins in the water column. If any deleterious effects are noted from the initial disposal activities the Navy would be required to cease dumping and establish a new disposal site in a more appropriate area. Third, at the same time that the monitoring phase of the study begins, an intensive study of the hydrographic characteristics of eastern Long Island Sound, Block Island Sound and offshore areas, be undertaken. Fourth, at the same time as the foregoing proposed studies are underway the Navy and the U. S. Army Corps of Engineers would be responsible for initiating studies as to the possible alternatives to ocean dumping in the southern New England area. Alternatives might include using dredging spoils for reclamation of disturbed or destroyed marsh land using the cleaner spoils for land fill for housing developments, etc. Fifth, and finally, the above activities should be done with a total involvement of the community, i.e., planning should be done with representatives of the fishing industry, conservation groups and general public well aware of the reasons for the various activities. This should dispell the suspicion that the Corps of Engineers and other agencies are proceeding with projects inimical to the best interest of the public.

It was agreed that the Corps is to develop, in the next two or three weeks, an outline of the research activities which it believes to be essential for future studies in the Long Island Sound area. This outline will be furnished to the members of the Subcommittee along with the environmental

impact statement prepared by the Navy on dredge spoil disposal activities to date at the New London site. The Subcommittee will then amend or develop a set of recommendations in regard to the types of studies which should be most effective in providing information to environmental managers and agencies responsible for ocean dredging. The New England Division, Corps of Engineers, would then sponsor or plan a hearing in which representatives of the fishing industry, conservation groups, etc. could be advised of the plans for research at the New London dredging site as well as possible alternatives to ocean disposal and dredging spoils.

Finally, the Subcommittee and members of the Corps of Engineers had a brief discussion of similar problems in Massachusetts Bay where studies are already underway but apparently with no overview as to the objectives and management of the data to be obtained from these studies. The studies in Massachusetts Bay include the NOMES, BIOME and other studies sponsored by state and other federal agencies.

cc: Center
V. Andreliunas
C. Hard
J. Pragar

Exh. B

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM, MASSACHUSETTS 02154

REPLY TO
ATTENTION OF:
NEDOD-P-1

1 March 1974

SUBJECT: U.S. Navy Application to Dredge in Thames River

HQDA (DAEN-CWO-N)
WASH D C 20310

1. The application by the U.S. Navy for a Corps of Engineers permit for work in the Thames River, Connecticut has stirred considerable public controversy. Disposal of the dredged material at the New London Dumping Ground as proposed has brought objections from Congressman Robert H. Steele of Connecticut, Congressman Otis G. Pike of New York, and several influential citizen groups. Accordingly, the file is forwarded for review and action.

2. As required by 33 CFR 209.120, the following information is provided and supported by Inclosures 1 through 5.

a. Name of Applicant: Department of the Navy
Northern Division
Naval Facilities Engineering Command
Philadelphia, Pennsylvania 19112

b. Location of Proposed Work: Thames River from Long Island Sound to the U.S. Naval Submarine Base in Groton, Connecticut.

c. Character and Purpose of Proposed Work: Dredging of the Thames River Channel 7.5 miles from the U.S. Naval Submarine Base to Long Island Sound. The channel will be generally 500 feet wide to 36 feet below mean low water. The Navy plans to dredge two mooring basins to 38 feet below mean low water, one at the Naval Underwater Systems Center, the other at the Connecticut State Pier. Total material to be removed is approximately 2,800,000 c.y. of river bottom sediment. Disposal is proposed to be in the Connecticut portion of the New London

Dumping Ground. The purpose of this project is to assure the development of the full capabilities of the new SSN 688 class nuclear submarine to be assigned to the U.S. Navy Submarine Base in Groton.

d. Other Federal, State and Local Authorizations Required: No other authorizations or approvals are required for work to be performed by Federal agencies.

e. Public Notices, Public Hearings and Objections Raised: The public notice was issued on 26 July 1973 and two public meetings were held concerning this application. One meeting was held on 28 August 1973 at Fitch Jr. High School in Groton, Connecticut, and the second on 11 September 1973 at Greenport High School in Southold, Long Island, New York. Announcements of these meetings were released on 26 July 1973 and 22 August 1973 respectively. Announcements were sent to all Federal, State and local and other authorities and interests known to be interested in this project.

Comments raised at the public meetings and my responses are as follows:

1) Comment of Rep. Robert H. Steele and others:

Congressman Robert H. Steele, Connecticut, feels that little is known about the New London Dumping Ground despite the fact that it has been historically used as a dump site. He supports the dredging but would prefer the use of an ocean site regardless of cost, because, in his opinion, if there are harmful effects it would be better if an ocean site were used. Congressman Steele's comments were also voiced by Kenneth Stober, Representative, 42nd Conn District and Richard Stark representing the Mayor of the City of Groton.

Response: Although we have some information on the New London Dumping Ground from a study of a previous Navy dredging project of 92,500 c.y., no comprehensive study of a project of this magnitude has ever been conducted. In order to monitor the effects of both the dredging and the disposal operations a comprehensive study program is being developed. The program is designed to give early indication whether any significant adverse environmental effects result from this project. If

significant effects are found the dumping will be moved to an alternate site. The location of alternate sites will be explored under this study program. Although I anticipate some localized environmental degradation, I feel this is greatly outweighed by the public benefits to be derived from this project and by the economic advantage of using a nearby site. In addition, there is no indication whatever that any other site would result in less environmental impacts.

2) Comment of Rep. Otis G. Pike, New York, and Sen. Perry Duryea, New York State Senator:

Congressman Otis G. Pike and State Senator Perry Duryea are opposed to the dumping of this spoil anywhere in Long Island Sound because currents may carry suspended polluted spoil material into New York thereby degrading the quality of New York waters.

Response: This project may possibly cause a temporary lowering of water quality in Long Island Sound. However, the study program is being designed to detect possible serious environmental harm before it develops. From all data currently available, net movement of bed materials is minimal and away from Fisher's Island into Long Island Sound.

3) Comment of Commissioner Henry L. Diamond, New York State Department of Environmental Conservation:

Commissioner Henry L. Diamond of the New York State Department of Environmental Conservation felt that no environmental impact statement qualifying under NEPA and CEQ guidelines had been prepared. He also criticized the revised draft environmental impact statement and the fact that New York was not asked to participate in the selection of the dump site or the study program. He also stated that the proposed disposal of this dredged spoil in the New London dumping ground would subject the resources of Long Island Sound to significant potential damage. Therefore, he recommended that alternative spoil disposal areas and methods be further explored.

Response: Subsequent to the public meetings New York D.E.C. has reviewed the final EIS and is participating in development of the study program.

4) Comment of Richard B. Erickson, Southeastern Connecticut Regional Planning Agency:

Mr. Erickson supports the proposed dredging as it is of benefit to the Nation's defense and to the economy of Southeastern Connecticut. However, the agency had three questions concerning the disposal.

a) What criteria were used in selecting the New London dump site as the primary site? Was cost a consideration?

b) Once dumping is underway, how much environmental damage would be done before a problem is identified and dumping stopped?

c) Is there a danger that tidal action may eventually move the dumped spoil onto the shore of Southeastern Connecticut?

Response:

a) The New London dump site was chosen by the Corps as being the most appropriate site taking both economics and the environment into consideration.

b) NOAA scientists in conjunction with interested Federal and State agencies will determine whether significant environmental damage occurs. They will so advise the Division Engineer.

c) The Navy maintains that "the current directions and speed measured during these investigations (of the New London Disposal Site) indicate that any resuspended sediments would undergo limited net transport and probably would remain in the general vicinity of the disposal site." Also, the study program provides for continuous monitoring and allows for a halt of dredging or a change of disposal sites if adverse movement is evident.

5) General Comment made by the following:

Richard H. Miller, Long Island Fishermen's Association
Pat Denoia, Conservation Commission, Groton, Connecticut
James Homan, Councilman, Town of Southold

Ruth G. Bowers, Chairman, Ct Chapter of the Sierra Club
Mary B. Walton, President, Save our State Committee
William C. Spicer, Jr., Marina Operator, Groton
V. S. Spinella, Fishers Island Lobsterman's Association
Betty Chapman
Dr. M. Llewellyn Thatcher, Scientific Advisor to the Fishers Island Civic Association
Charles D. Hardy, Southold
Mrs. W. Dove, North Fork Audubon Society
Albert Martocchia, Town of Southold
Loraine S. Terry, President No. Fork Environmental Council, Inc.

How will the spoil be contained at the disposal site and prevented from returning to the river and/or contaminating Long Island Sound?

Response: Data obtained from study of the previous dumping indicates that any resuspended sediments would undergo limited net transport and probably would remain in the general vicinity of the disposal site. Additional study proposed for this project will provide for this continuous monitoring and allow for a halt of dredging or a change of disposal sites if adverse movement is evident.

6) Comment of Thomas A. Parott, Fishers Island Civic Assoc., Inc., and Dr. M. Llewellyn Thatcher, Scientific Advisor to The Fishers Island Civic Assoc., Inc.

Comparison of the test dumping in 1972 of 92,500 cubic yards of spoil material with the proposed dumping of 2.8 million cubic yards is not valid.

Response: As stated in the Environmental Impact Statement, "The microscale sample is often used to predict the effects of actions at the macroscale." There really is no other way to judge until the full action is undertaken.

7) General Comment of the following:

Ruth G. Bowers, Chairman, Chapter of the Sierra Club
Carlton D. Hunt, Marine Sciences Institute
Steve G. Hapis
Mrs. W. Dove, North Fork Audubon Society

Richard H. Miller, Long Island Fishermen's Association
Mrs. E. E. Post, Sierra Club, Long Island Sound Task Force
Loraine S. Terry, President No. Fork Environmental Council, Inc..
Orville W. Terry, Biologist
Natalie R. Raferty, President, Fishers Island Civic Association
Virginia Bennett Moore
Mary B. Walton, Save our State Committee
William C. Spicer, Jr.
Gilbert Wagner, Environmental Manager for Pfizer, Inc.
Ronald Monroe

Neither the New London Dumping Ground nor any site in Long Island or Block Island Sound should be used because the material is polluted, under EPA guidelines, and no assurance has been given that pollution or ecological damage will not result.

Response: There will likely be local increases in pollutants at the dump site. These increases are expected to be of limited extent and to abate rapidly following cessation of dumping. The monitoring program will allow detection of adverse environmental effects at an early stage. The object of environmental consideration is not to prohibit all adverse effects, but to identify and quantify them. That knowledge is then used in the balancing process with other factors of public interest to reach a sound conclusion on a reasonable course of action.

8) Comment of V. S. Soinella, Fishers Island Lobstermen's Assoc., Inc., and Michael Ludwig, National Marine Fisheries Service, Division of Water Resources:

The spoil disposal area, the New London Dumping Ground, is primarily in New York State.

Response: The New London Dumping Ground has been shown to be approximately 80% in Connecticut State waters. All dumping will take place at a buoy which will be located within Connecticut Waters.

9) Comment of Loraine S. Terry, President, No. Fork Environmental Council, Inc.; Charles D. Hardy, Oceanographer, SUNY, Stony Brook; and Orville W. Terry, Biologist:

What are the radioactive characteristics of the spoil? The potential for transport of radioactive isotopes has not been adequately explained in the EIS.

Response: This question has been answered by the Navy in the Final Environmental Impact Statement. It states that radioactivity concentrations involved are well below allowable limits for human consumption and exposure of marine resources.

10) Comment of Vincent Spinella, Fishers Island Lobstermen's Association:

Dumping of dredged spoil from the Thames River would make the survival chances of lobsters in the disposal area "nil."

Response: A study of a Rhode Island Dump Site stated that, "The area to be influenced is small compared to the total area fished. Saila, et al (98) in a similar situation did not find evidence of lobster mortality. In fact, lobsters were among the first mobile benthic organisms to reinhabit the Rhode Island Dump Site." Further, Saila, et al, also noted, "the ability of lobsters to pass large quantities of polluted sediment through their gills with no adverse effects."

11) Comment by the following:

Jean H. Tiedke, Vice President for Community Affairs, League of Women Voters
Natalie R. Raferty, President, The Fishers Island Civic Assoc.
Virginia Bennett Moore
Lois C. Geary, Chairman, Groton Conservation Commission
Mary B. Walton, Save our State Committee
Ruth G. Bowers, Chairman, Chapter of the Sierra Club
Michael Ludwig, National Marine Fisheries Service, Division of Water Resources
Richard H. Miller, Long Island Fishermen's Association
Pat Denoia, Groton Conservation Commission
Robert J. Flanagan, Director of Real Estate, City of New London

Alternate sites or methods of disposal should be found

Response: Alternative sites and methods for disposal have been extensively considered and were found to be less desirable than controlled dumping in an already spoiled area.

12) Comment of William Spicer, Jr., and William Spicer III

There appears to be bedrock ledge in the Thames River under areas to be dredged. If bedrock is found will it be blasted and will it be dumped in the New London Dumping Ground?

Response: According to the Deputy Transportation Commissioner of the Connecticut Bureau of Waterways, there is no history of vessels grounding on ledge in the Thames River Channel. Additionally, extensive borings conducted by the Navy and the Corps did not encounter bedrock at the proposed channel depth.

13) Comment of William C. Spicer, Jr.; William Spicer III; and Charles Hardy:

The New London Dumping Ground is only 36' deep in one area, can it take all of the spoil material and still be deep enough for future use.

Response: Depth of most of the dump site ranges from 60-80 feet. The north central section is 36 feet deep. However, the site can easily absorb the 2.8 million cubic yards without reducing the depth any significant amount. The material is not expected to build up on any high points but to accumulate in low points.

14) Comment of Mrs. Betty Chapman:

Will there be any immediate bad effects such as unpleasant odors, air pollution increases, silting of beaches and/or disruption of sport and commercial fishing.

Response: None of these effects were found during operation of the previous Navy project and are not anticipated here.

15) Comments of Lois C. Geary, Chairman, Groton Conservation Commission:

a) Will we have to look forward to more dredging activity in 10-15 years and has this possibility been figured into the long term environmental cost?

b) What priorities are established between the commercial and recreational value of the Thames River and the military value?

Responses:

a) There has been no need in the past fifteen years for maintenance dredging of the present channel. Since the proposed channel depth will only be increased approximately five feet, it should not have a major change upon the hydrology of the channel and should not increase silting. A proposed Federal navigation project, not yet authorized, may add 1.4 million cubic yards. Whether the project will be authorized or when is unknown.

b) All demands on resource commitment are weighed to determine what uses are in the best overall public interest. Many times, as in this estuary, recreational, commercial, and military uses can satisfactorily co-exist.

c) Additional private dredging projects may occur. However, no specific projects are known at this time.

16) Charles P. de Biasi, Director of Public Works, City of New London, is in favor of the project.

17) Comment of Lois G. Geary, Chairman, Groton Conservation Commission:

Will the public have the opportunity to study information gained from the investigations of the dredging and dumping proposal?

Response: The results of this monitoring program and any other studies concerning the project are public information.

18) Comment of Charles D. Hardy and Ruth G. Bowers, Chairman, Connecticut Chapter of the Sierra Club:

The May 1973 EIS stated that the disposal site off of Rhode Island was the most environmentally suited, now the New London Site is to be used, why?

Response: The Rhode Island Dump Site was selected without Corps input. Our information does not support the use of the Rhode Island Dump.

19) Comment of Ruth G. Bowers, Chairman, Connecticut Chapter of the Sierra Club:

Environmental Impact Statement does not deal with bottom material, in particular, sediment size, average current velocities in the area, direction of the velocities and their full patterns.

Response: Final EIS contains information on bottom sediment. The proposed study program will gather data on currents to assess bottom sediment movements.

20) Comment of Michael Ludwig, National Marine Fisheries Service, Division of Water Resources:

Will the Navy utilize the study program. Who will make the decision to stop work if significant adverse environmental effects are found, how long will it take to stop work? ?

Response: Prior to issuance of a permit, a study program acceptable to the Division Engineer will be designed and provisions made for implementation. This program will include studies of environmental effects, alternative sites which might be utilized, and will provide for integration of these studies with all other study and research programs now under way. The Division Engineer will immediately suspend the permit when he considers it necessary to protect the public interest.

21) Comment of the following:

Pat Denoia, Groton Conservation Commission
Captain Les Marsh
Penolope C. McPherson
Betty Chapman
Lois C. Geary, Chairman, Groton Conservation Commission
Philip Michalowski, Development Coordinator, City of New London
Vincent Spinella, Fishers Island Lobstermen's Association
Ruth G. Bowers, Chairman, Chapter of the Sierra Club
Thomas A. Parrott, Fishers Island Civic Association, Inc.

Many of the remaining comments concerned adverse environmental effects of using the New London Dumping Ground which could result. But, background information is insufficient to make any real assessment of the degree of impact.

Response: A comprehensive study program is being developed which will provide for a pre-dumping survey, continuous monitoring during dumping operations and post-dump surveys. This study will allow early detection of any adverse environmental effects. It will also provide that dumping operations will be moved to an alternate site if significant adverse effects occur.

f. Views of State and Local Authorities:

1) The Connecticut Department of Environmental Protection feels that with the expertise of the Interagency Committee on Ocean Dumping, the participating agencies, and the scientific and academic community's currently available research information, a reasonable spoil disposal location will be determined, properly controlled and utilized. They have subsequently concurred with use of the New London Dumping Ground as the primary disposal site.

2) New York State Department of Environmental Conservation has reviewed the draft environmental impact statement and is participating in development of the environmental evaluation program. It is expected that if proper controls and safeguards are included in such a program, that agency will withdraw its objections.

3) Robert H. Steele, Representative, Second Connecticut District and Kenneth Stober, Connecticut State Representative, 42nd District, approve of the project but want the spoil material disposed of outside of Long Island Sound.

4) Mayor of the City of Groton and the City Council approve of the dredging but would like the material disposed of elsewhere.

5) Mayor of the Town of Groton and the Town Council support the project as outlined in the present plans.

6) Town of Southold, New York, does not object to the dredging but expresses concern over the use of the New London Dumping Ground.

g. Views of Division Engineer Concerning Probable Effect of the Work On:

1) Navigation, present and prospective:

Currently there are several problems affecting navigation in New London Harbor and the Thames River. The depth of the harbor channel, 33 feet at mean low water, is not sufficient for large vessels now coming into prominent use. In addition, the approach to the State Pier is too limited in depth and area for today's traffic.

The channel in the Thames River has numerous bends, the most troublesome of which are located near the railroad bridge. Vessels approaching the bridge from the north must go slowly to align themselves with the bridge opening. But going slowly reduces their maneuverability in negotiating the bends and creates a hazard of becoming lodged crosswise in the channel or striking the bridge abutments. Other bends upstream also impede navigation and require extreme caution.

This project will result in deepening the channel to 36 feet, the approach to the State Pier to 38 feet and generally widen and straighten the channel removing some troublesome bends. Therefore, the project will have a beneficial effect on commercial and military navigation.

2) Harbor lines, if established:

No effect is anticipated.

3) Flood heights and drift.

No effect is anticipated.

4) Beach erosion or accretion:

This project should have no effect on natural sediment transport within this project area.

5) Fish and wildlife:

This project should have no long term effect on the natural resources of the areas involved. Although it is anticipated that some short term disruption of the resources will occur while work is being performed, the study program which will continuously monitor both the dredging and the disposal operation should detect environmental damage, if any, before it becomes serious.

6) Water Quality:

This project will result in a temporary lowering of water quality in the vicinity of the dredging and disposal operations. No long term effect is anticipated.

7) Aesthetics:

The proposed action will not adversely affect air and noise quality within the project areas of either the dredging or the dumping operations. Offensive gases may be liberated during the dredging operation. This effect, if it occurs, will be a short term one but possibly annoying to recreational interests such as boating in the proximity of the dredging operation. However, no odors were detected during operations at the Naval Base.

8) Ecology:

Some minor short term adverse effects are anticipated but no long range environmental impacts are expected.

9) Historic value:

No effect on historic resources is anticipated.

10) Recreation:

No effect is anticipated although caution should be used by recreational boats in the vicinity of the dredging operation.

11) Economy:

Economic benefits may be realized from reduced transportation and handling charges for deep draft receipts of petroleum and liquid chemicals. Employment and regional economy will be bolstered. Failure to carry out the project will result in a severe adverse economic effect on the region which includes a significant segment of Rhode Island. The project will also reduce the cost of the public works project planned by Corps, should that project be approved.

12) Water supply:

This project will have no effect on water supply.

13) Public interest:

Impact on various factors affecting the public interest are all favorable or neutral except for some adverse effects anticipated regarding water quality and fishery resources in the vicinity of the dredging and disposal site.

h. Other pertinent remarks: The proposed work has been determined to be essential for the national defense. The only alternative available to dredging is to locate the facility elsewhere. However, the Navy reports that duplication of shore facilities elsewhere, which already exist at Groton would cost $184,000,000. Hence, there are no reasonable alternatives to dredging.

In any case, the central theme which has emerged from extensive discussion at all levels of government and in two public meetings is:

1) There is no substantive objection offered to the dredging project

2) There is wide objection to dumping dredged sediment in Long Island Sound

3) No reasonable alternative has been proffered to dumping in the Sound.

In terms of statutory responsibilities, the Corps of Engineers designates dumping grounds within the inland waters under Section 404 of the Federal Water Pollution Control Act Amendments of 1972. Such designation is subject to EPA review with respect to water quality standards and other specific adverse effects set forth in that Act. The New London Dumping Ground is situated on the state line, about 75% in Connecticut and 25% in New York. However, it is planned to "point dump" at a marker buoy located well within Connecticut waters.

The substance of arguments against dumping in the Sound is that sediments will cause a degradation in the quality of the surrounding water, thereby violating State and National environmental objectives and have an adverse effect on fishery resources in the

4. Accordingly, the Division Engineer is authorized to issue the permit

area. It is stated that such effects are not in the public interest and may cause irreparable harm to the users of Long Island Sound. The point is made that money spent for sewage treatment in estuarine waters would be negated by such action.

These statements cannot be accepted on face value without close examination of the facts supporting the action, as they are known. They are, in summary:

(1) The use of the dumping ground for similar materials has been exercised for at least 40 years. There is no record or evidence of degradation of fisheries, water quality, or recreational use of the Sound's water as a result.

(2) A limited baseline survey and observations during and after dumping of a recent lesser job tend to indicate that dumped material remains close to the point of discharge. This remains to be confirmed by more detailed observation as does the effect of the leaching elements into the water column. The absence of such confirming data is not regarded as being prohibitive to use of the dumping ground in light of the absence of any information to the contrary or any indication that some other area would result in less adverse effects on environmental resources.

i. The Final Environmental Impact Statement was submitted by the Navy to the President's Council on Environmental Quality on 7 January 1974. It stated that some adverse effects on fishery resources, infaunal and epifaunal biota, and water quality might be anticipated at the dredging site and at the disposal site. The extent of the adverse effects were generally not quantified. However, from all available data, adverse effects are likely to be minor and temporary. It stated that a study and monitoring program would be used to provide early detection of adverse environmental effects should they occur. It discussed possible alternatives to dredging and also alternative spoil disposal measures. The full impact statement is included with the file material transmitted with this report.

It should be noted most emphatically that the impact statement refers to the Scientific Advisory Subcommittee as having made the recommendation to use the New London Dumping Ground. We had previously advised Navy officials that the recommendation was that of the Division Engineer. The Scientific Advisory Subcommittee is a strictly informal group of representatives of NOAA, EPA,

U.S. Fish and Wildlife Service, NED, and various State environmental agencies, whose function is to advise the Division Engineer on scientific matters involved in ocean dumping. The decision on designating an ocean disposal site reflects the total public interest and not only scientific aspects thereof. The impact statement grossly misrepresents the function of that informal committee.

j. Conclusions:

1) Two basic conclusions were reached through review of all available data.

a) Dredging the Thames River channel is the only viable alternative to provide accomodations for the new 688 class submarines.

b) Sea dumping is the best available alternative for disposing of the dredged material.

2) Sea Dump Alternatives

a) Long Island Sound. The obvious best alternative with respect to economics and use of dredging plant facilities i.e., tow boats and scows, is to dump the material as nearby as possible. The existing New London Dumping Ground is only a few miles away and would be a likely choice. This is consistent with the intent of the Federal Water Pollution Control Act Amendments of 1972 to use existing sites wherever possible. It may also be appropriate, considering environmental concern for sport and commercial fishery areas near Fisher's Island, to use some other existing dumping ground in Long Island Sound. The only two major dump sites within range of the Thames River are Cornfield Shoal and New Haven. The New Haven site is proposed to be used for large quantities of material from Corps and private dredging projects during the next several years. The effects and area of influence of existing dumping projects are being measured and must be determined before superimposing such an additional large quantity of material. The Cornfield Shoal dumping ground has been historically used for clean sand dredged from the Connecticut River. There appears to be no sound reasoning to start dumping polluted materials

there at this time. On the other hand, the New London Dumping Ground has been extensively used previously for disposal of materials exceeding EPA ocean disposal criteria. The surrounding area remains a viable eco-system as evidenced by the active lobster fishery between the dump site and Fisher's Island and charter fishing boats which reportedly fish extensively in the area.

b) Block Island Sound. There has been considerable discussion during the past several years regarding the wisdom of dumping any material at all into Long Island Sound. While existing data would not preclude use of a Long Island Sound Dump site, it is appropriate to examine other areas. The next adjacent body of water is Block Island Sound, Rhode Island. Limited physical data and fishery data are available from studies conducted by NED, The Naval Underwater Systems Center, and others. This would be supplemented by a reconnaissance survey of Block Island Sound in conjunction with this permit to determine which specific areas, if any, have little or no important fisheries resources and where bottom currents and topography are appropriate for sea disposal. However, even if an appropriate area were found, the political atmosphere for dumping in Rhode Island waters is dim. It is not likely that a site could be selected and used without a long confrontation with officials of Rhode Island who are adamantly opposed to the idea. Hence, if any environmentally acceptable alternative is found in Block Island Sound, due to political and pragmatic considerations, it should be pursued only as a last resort.

c) Offshore Disposal. Little is known of impacts from offshore dumping on water quality, fauna, and flora. Existing data, while far from conclusive, points to the New London Dumping Ground as an environmentally acceptable disposal site. There appears to be no justification for additional expense of going to the open ocean. However, since background data is inconclusive, this alternative will be examined in the study.

3) Considering the factors affecting the overall public interest:

a) National defense requires that the dredging be done. The only bearing it has on selection of a disposal site is that the work proceed in a timely manner. If the most

environmentally and economically suitable site cannot be used for any reason, then the most expeditious site should be used.

b) Environmental Impact. The extent of effects is largely unknown, no matter which site is selected. An extensive environmental evaluation program must be undertaken in conjunction with any dumping program. Preliminary data indicate less of an impact than many concerned people have feared. But, due to lack of data, there is little to choose between one site and another on the basis of environmental effects.

c) Economic Consideration. NED estimates the project would cost about $10,000,000 to dump at New London, $17,000,000 to dump in Block Island Sound, and somewhat more than $17,000,000 to dump at the site south-southeast of Block Island. Clearly, the most economic alternative is the New London Dumping Ground.

d) Weighing these factors to select the optimum alternative indicates that national defense calls for expediency, environmental factors are relatively the same from site to site, and economic factors point strongly to the New London Dumping Ground.

4) The conclusion is that the public interest would best be served by use of the New London Dumping Ground. However, if this area were used and was found to result in adverse environmental effects or if legal or administrative action might seriously delay carrying out the work, it would then be in the best public interest for national defense purposes to dump at an alternative site which must be determined on the basis of scientific survey and coordination of political entities involved.

5) Some procedural considerations are not yet resolved. The Environmental Protection Agency has not commented with regard to use of the New London Dumping Ground. They are waiting comments from the Connecticut Department of Environmental Protection and the New York Department of Environmental Conservation. Those agencies are waiting development of the environmental evaluation program. The Environmental Protection Agency must be given notification of intent to designate New London Dumping Ground 15 days prior to issuing the permit, if that course of action is decided upon.

NEDOD-P-1 1 March 1974
SUBJECT: U.S. Navy Application to Dredge in Thames River

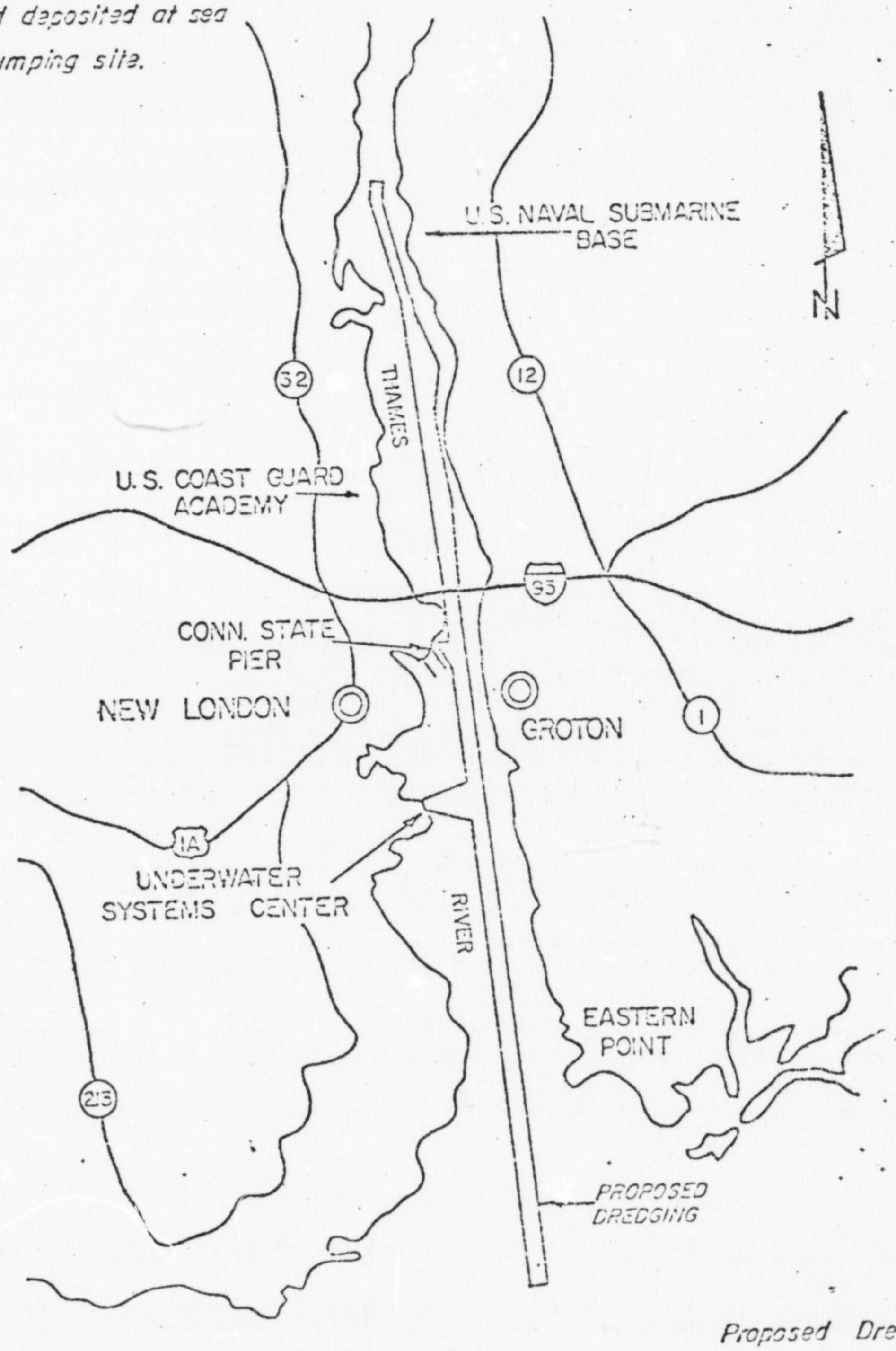
k. Recommendations: I recommend that a Federal permit be granted to the U.S. Navy to perform dredging as requested and that the Corps of Engineers designates the New London Dumping Ground as the primary disposal site. Alternative dumping grounds will be explored as a condition of this permit. All standard permit conditions should apply in addition to which the following special condition should be added:

That prior to commencement of work the permittee will have received approval from the Division Engineer of a comprehensive monitoring and environmental effects study to be funded by the applicant in an amount not to exceed $500,000. The study program will be developed in concert with representatives of Federal and State Governments having an overview of the Long Island Sound region natural resources, and will be administered by a Federal Agency under an arrangement acceptable to the Division Engineer. Provision will be made in the program for participation by a representative segment of the scientific institutions of the Long Island Sound region, for information exchange, and for integration of these studies with others of a similar nature now under way or being planned. The applicant will designate a point of contact for purposes of coordinating scientific information and administration of this work.

Incl
as stated

JOHN H. MASON
Colonel, Corps of Engineers
Division Engineer

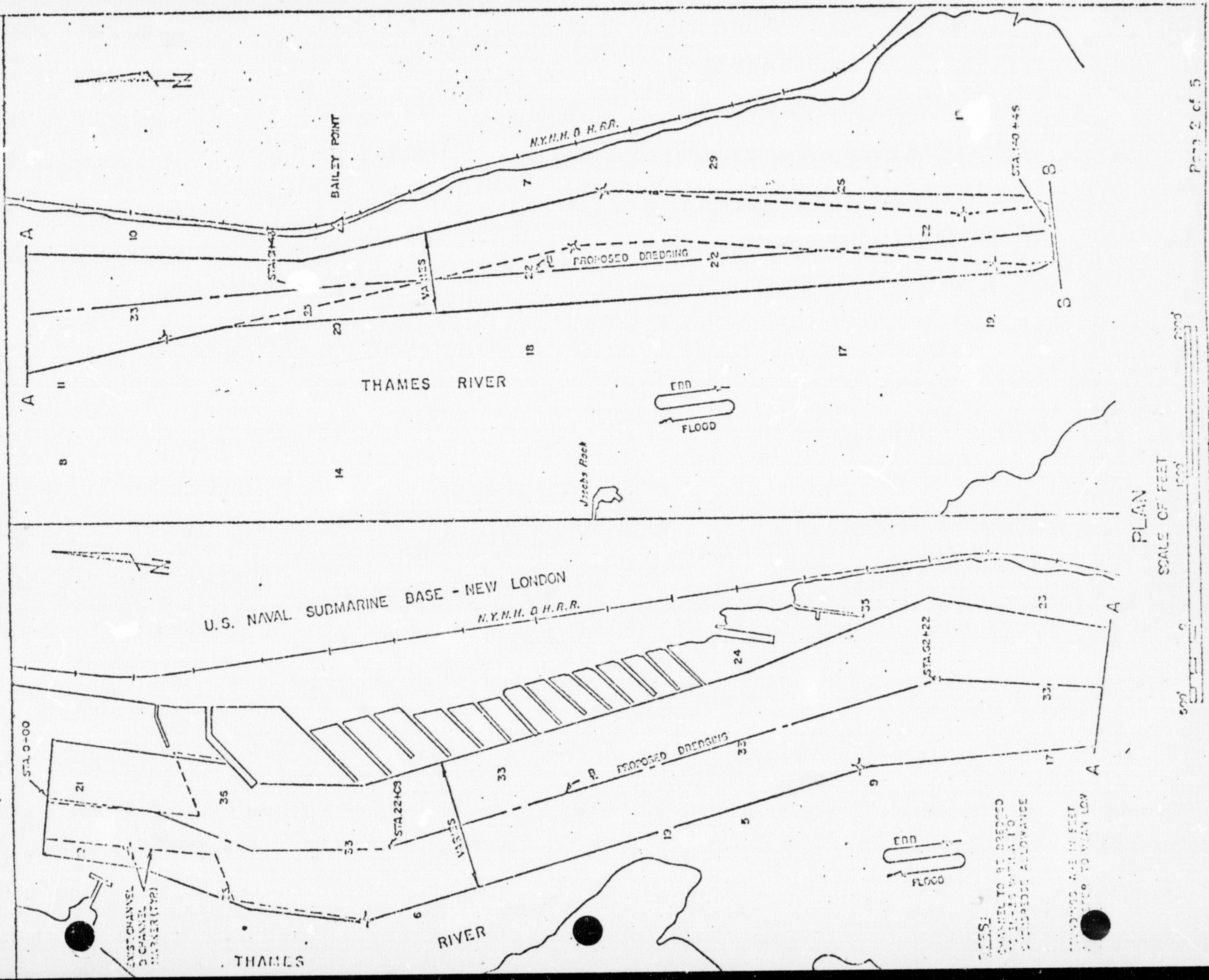
Approximately 2,800,000 cubic yards
dredged and deposited at sea
in an approved dumping site.

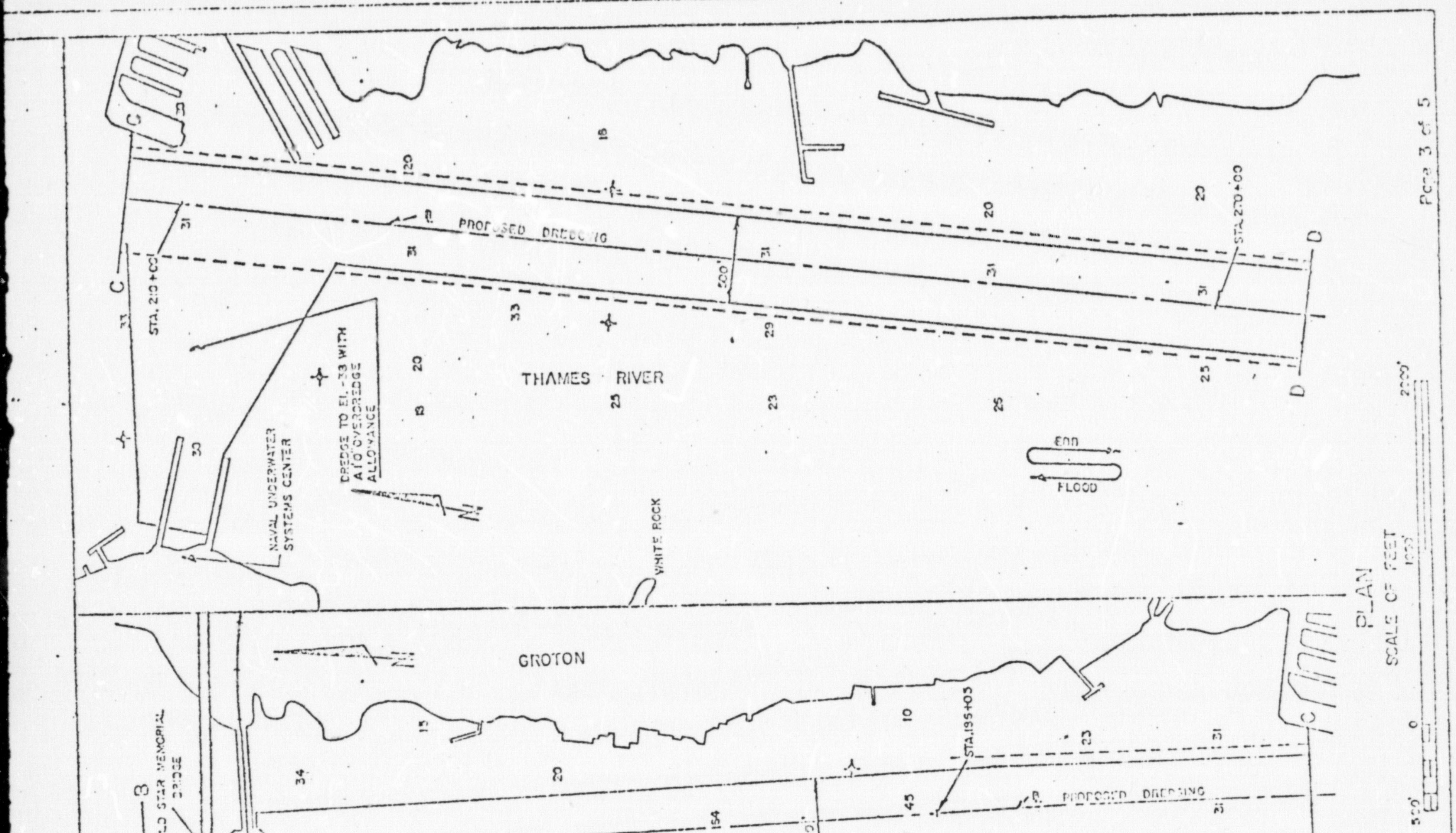


LOCATION MAP
SCALE IN MILES

1 0 1 2 3

Proposed Dredging
in Thames River
at New London & Groton
County of New London, State Conn.
Application by U.S.N.


BAILEY POINT
N.Y.N.H. & H.R.R.
THAMES RIVER
PROPOSED DREDGING
EBB
FLOOD
Jacobs Rock
U.S. NAVAL SUBMARINE BASE - NEW LONDON
N.Y.N.H. & H.R.R.
PROPOSED DREDGING
EBB
FLOOD
RIVER
THAMES
PLAN
SCALE OF FEET
Page 2 of 5


THAMES RIVER
PROPOSED DREDGING
STA. 210+00
STA. 270+00
DREDGE TO EL.-33 WITH A 1.0' OVERDREDGE ALLOWANCE
NAVAL UNDERWATER SYSTEMS CENTER
WHITE ROCK
EBB
FLOOD
GROTON
GOLD STAR MEMORIAL BRIDGE
STA. 140+46
STA. 195+03
STATE PIER
NEW LONDON HARBOR
PLAN
SCALE OF FEET
Page 3 of 5

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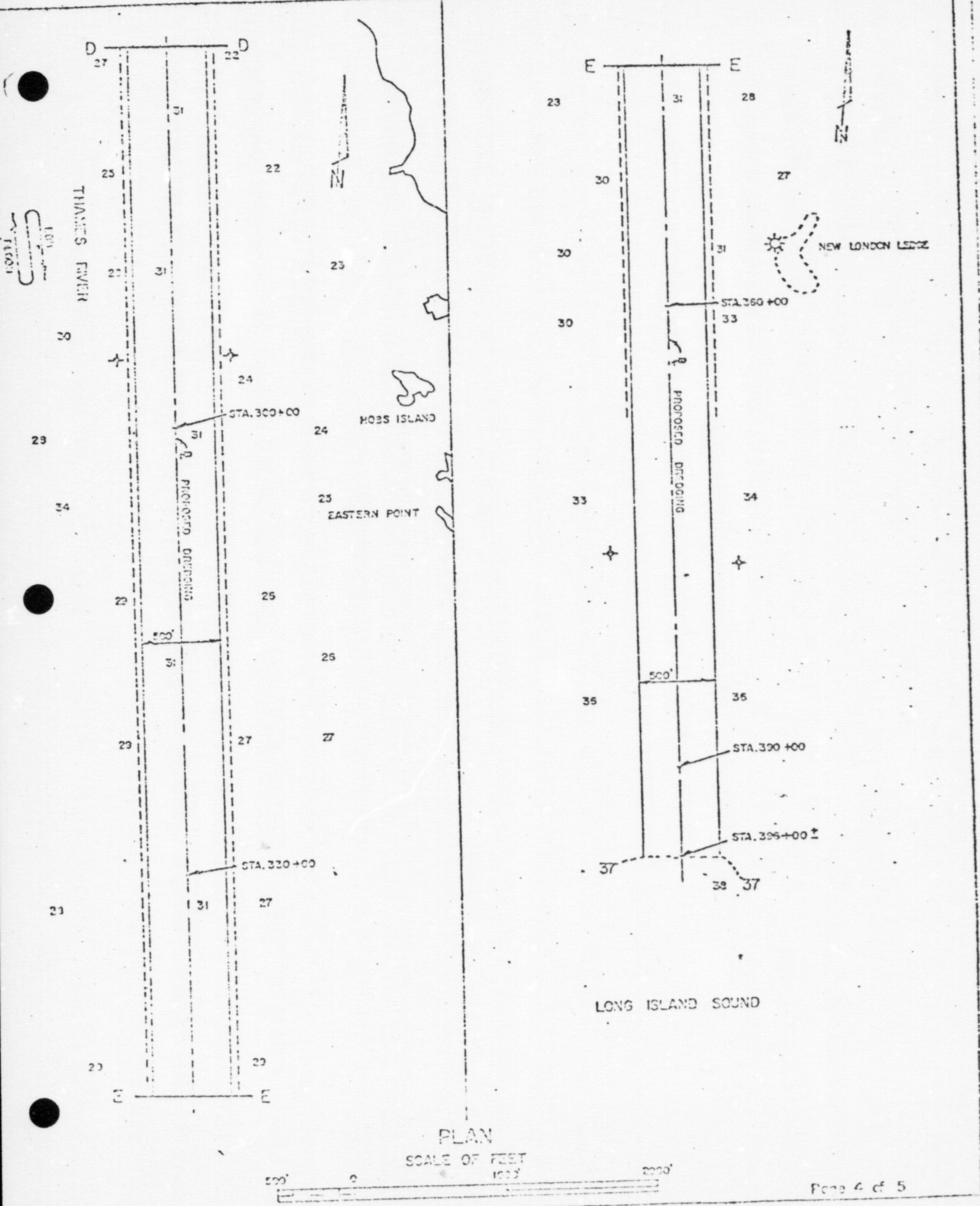
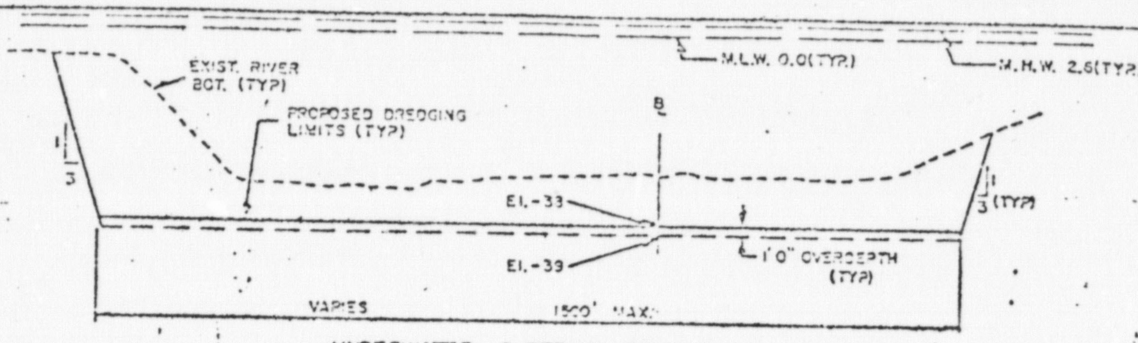
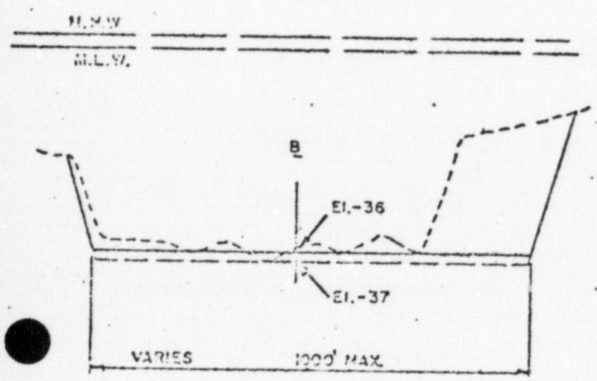


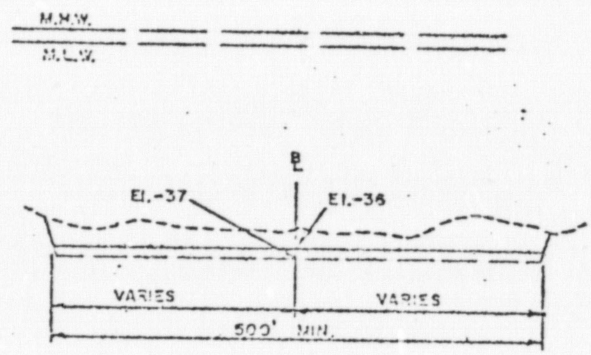
PLAN
SCALE OF FEET



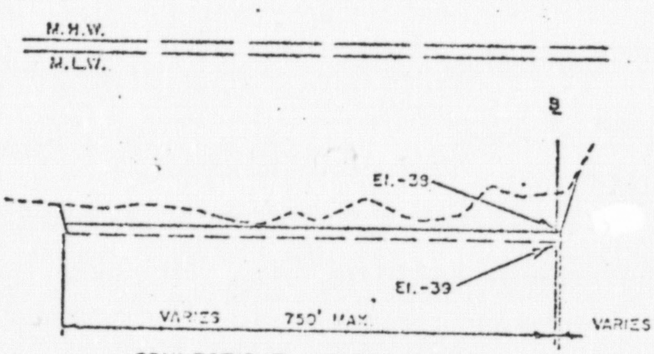
UNDERWATER SYSTEMS CENTER



NORTH OF
COLD STAR MEMORIAL BRIDGE



SOUTH OF
GOLD STAR MEMORIAL BRIDGE



CONNECTICUT STATE PIER

TYPICAL SECTIONS

NOT TO SCALE

DAEN-CWO-N(1 Mar 74) 1st Ind
SUBJECT: U.S. Navy Application to Dredge in Thames River

DA, Office of the Chief of Engineers, Washington, D. C. 20314 13 Mar 74

TO: Division Engineer, New England

1. We have reviewed the data developed on the application of the U. S. Navy to dredge in the Thames River from Long Island Sound to the U.S. Naval Submarine Base in Groton, Connecticut and to utilize the New London Dumping Ground as the primary disposal site for this dredged material.

2. Included in this review has been the Environmental Impact Statement prepared by the Department of the Navy and filed with the Council on Environmental Quality on 9 January 1974, and we concur in its findings. In particular, we find that the proposed bucket dredging will minimize turbidity increases and indirect changes in water quality in the Thames River. In addition, we also find that the alternatives for disposal of the dredged material on land disposal sites, including combinations of land and sea disposal sites, use of the dredged material as agricultural soil, incineration before dumping, and containerized ocean dumping were all adequately discussed and rejected in the EIS in favor of disposal at the New London Dumping Ground. We further note that the U. S. Navy has agreed to fund a concurrent monitoring and environmental effects study to be administered by the National Oceanographic and Atmospheric Administration which may result in the use of another open water disposal site at a later date. Accordingly, we find, after comparing all of the alternative disposal sites and the environmental and economic effects which will result from the use of this dumping ground and including the consideration of the cumulative effect of all of the small marinas and commercial port dredging in Connecticut, that the New London Dumping Ground is the best site for the disposal of dredged material from this project.

3. In addition, we find that there has been ample notice and opportunity for hearing to allow everyone to express their views and submit information for use in the evaluation of this permit application. This information has revealed, in addition to the environmental impacts of this proposed activity as discussed in the Environmental Impact Statement, that a failure to dredge the 2.8 million cubic yards of material from the Thames River to allow the new and larger SSN 668 Class nuclear submarines, which are the new backbone of the submarine force essential to national security, to safely navigate to the New London Submarine Base could result in rendering this base obsolete. If the new submarines were based elsewhere, support facilities would have to be duplicated at a cost of $180 million compared to a cost of only $10 million to perform the proposed dredging. In addition, over 20,000 jobs in eastern Connecticut are dependent upon this base and the loss or reduction of a significant number of these jobs could well have a devastating impact on the economy of Eastern Connecticut. Thus, we find that the factors of national security and economic necessity are overriding in this case, and that issuance of this permit will be in the public interest.

4. Accordingly, the Division Engineer is authorized to issue the permit subject to the conditions of the draft permit form inclosed with ENGCW-ON letter dated 12 May 1970, subject: "Permit Policy, Practices and Procedures" and the following condition:

> It is understood that the permittee, prior to commencement of work and subject to the approval of the Division Engineer, will commence a comprehensive monitoring and environmental effects study which will be funded b the permittee in an amount not to exceed $500,000. The study program will be developed in concert with representatives of Federal and State Governments having an overview of the Long Island Sound region natural resources, and will be administered by the National Oceanographic and Atmospheric Administration under an arrangement acceptable to the Division Engineer. Provisions will be made in the program for participation by a representative segment of the scientific institutions of the Long Island Sound region, for information exchange, and for integration of these studies with othersof a similar nature now under way or being planned. The permittee will designate a point of contact for purposes of coordinating scientific information and administration of this work. In the event the monitoring and environmental effects study reveals the need to change the manner in which this authorized dredging and disposal activity is being performed this permit may be summarily suspended until the terms and conditions of this permit are modified as appropriate, to effect these changes.

5. Prior to issuance of this permit, however, the Division Engineer should notify the Regional Administrator, EPA, of his intent to issue the permit after 15 days from the date of this notification pursuant to Section 103(c) of the Marine Protection, Research and Sanctuaries Act of 1972 and Section (g)(17)(iv) of the proposed revisions to ER 1145-2-303 published in the Federal Register on 10 May 1973.

BY AUTHORITY OF THE SECRETARY OF THE ARMY:

J L Kelley BG USA
for J. W. MORRIS
Major General, USA
Director of Civil Works

wd all incl

Exh. E.

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM, MASSACHUSETTS 02154

REPLY TO
ATTENTION OF:
NEDOD-P-1

27 September 1973

Regional Administrator
Environmental Protection Agency
John F. Kennedy Federal Building
Boston, Massachusetts 02203

Dear Sir:

In accordance with Section 404 of The Federal Water Pollution Control Act Amendments of 1972 and 33 CFR 209.120, Section (g) (17), I have, by Public Notice dated 26 July 1973, specified the New London Dumping Ground for disposal of 2.8 million cubic yards of dredged spoil material. The material is from the Thames River, Connecticut, and will result from a proposed dredging project by the U.S. Navy in conjunction with their submarine base in Groton, Connecticut. The proposed work is the subject of a Draft Environmental Impact Statement to which your agency has provided comment. The final form of the Statement must be filed with the President's Council on Environmental Quality for a period of thirty days before any permit can be issued.

The Corps of Engineers has held two public meetings regarding this permit application. Public response has been generally in favor of the dredging project but strongly opposed to disposal in Long Island Sound. In anticipation that legal or administrative actions may delay or preclude the use of the New London Dumping Ground, I am specifying an alternate dumping ground to be used in case such delays are encountered. That dumping ground is now proposed to be located approximately 10 miles southeast of Block Island in an area one nautical mile square, the sides of which run True North and South and True East and West; the center of which is at 71°, 27.0'E and 41°, 03.[illegible]'N marked by a privately maintained buoy approximately 9.4 miles from Southeast Point Light, Block Island, on a bearing of 118° True. The depth of water ranges from 131 feet to 183 feet.

Use of this dumping ground presumes that certain questions of the physical capability of tow boats and scows to haul to an exposed area are overcome.

As indicated in the Draft Environmental Impact Statement, the material to be dredged does not meet the minimum requirements of the Ocean Dumping Criteria. However, as required by the Act and regulation cited in the first paragraph of this letter, I have investigated the economic impact on navigation and anchorage and find the use of the New London Dumping Ground to be in the best overall public interest. Use of the alternative dumping ground would be in the best public interest only if National Defense considerations warrant the added cost and if it is found that existing tow boat and scow equipment are capable of safe operation in exposed sea areas.

Section 404 (c) of the Federal Water Pollution Control Act Amendments of 1972 provides for your denial or restriction of the designation of the disposal sites after public hearing and a determination of an unacceptable and adverse effect on certain specified resources. Inasmuch as that Section also provides for our mutual consultation prior to taking any such action, please advise me within 15 days whether you intend to deny or restrict the use of the designated disposal site 10 miles southeast of Block Island, Rhode Island.

Sincerely yours,

JOHN H. MASON
Colonel, Corps of Engineers
Division Engineer

REGION I

J.F. KENNEDY FEDERAL BUILDING, BOSTON, MASSACHUSETTS 02203

October 25, 1973

Colonel John H. Mason
Division Engineer
New England Division, Corps of Engineers
U. S. Department of the Army
424 Trapelo Road
Waltham, Massachusetts 02154

Dear Colonel Mason:

This is in reference to your letter of 15 October 1973 requesting the designation of a dumpsite located at N41°-03' and W71°-29'. We have recommended to our headquarters that this site be designated as a permanent regional dumpsite if studies favor this location from the standpoint of fisheries and physical-geophysical data.

When the preliminary studies initiated by the Department of the Navy have been completed, we request that the results be forwarded to us for evaluation. At that time, if these studies indicate that the disposal of the 2.8 million cubic yards of material from the Thames River will produce nothing greater than a minimum impact on the marine environment, we would have no objection to the use of this site for the disposal of this dredged spoil.

It is our understanding that this site will be included on the new list of regional approved disposal sites which will be published in the Federal Register within the next few months.

Thank you for the opportunity to comment.

Sincerely yours,

Jeffrey G. Miller
Director
Enforcement Division

30 OCT 1973

30 OCT 1973

365

NEDCO-P-2 27 March 1974

Mr. John McGlennon
Regional Administrator
Environmental Protection Agency
John F. Kennedy Federal Bldg.
Government Center
Boston, MA 02203

Dear Mr. McGlennon:

This refers to the application of the U.S. Navy (Public Notice dated 26 July 1973) to dredge a channel and two mooring basins in the Thames River and dispose of 2,800,000 cubic yards of material in the New London Dumping Ground.

The laboratory analysis reveals that the spoil material is unsuitable for disposal in open waters under Section 227.61 (c) of Ocean Dumping Criteria.

Several alternatives for disposal were investigated including on-land disposal sites, combinations of land and sea disposal sites, use of the dredged material as agricultural soil, incineration before dumping, and containerized ocean dumping and rejected in the EIS in favor of the New London Dumping Ground.

I feel that this proposed disposal will result in minimal adverse environmental impact and therefore meets the criteria of Section 227.64, Disposal of Polluted Dredged Material.

Accordingly, after having given ample notice and opportunity for hearing and public response, and following review of the file by the Chief of Engineers, I have been authorized to issue a permit for the work. I intend to issue a permit for disposal of this material at the New London dump site located at approximately 72° 05' West longitude; 41° 16' North latitude subject to the following special condition: It is understood that the permittee, prior

depth in the Underwater Systems Center area averages 32 feet

NEDOD-P-2 27 March 1974
Mr. John McCannon

to commencement of the work and subject to the approval of the Division Engineer, will commence a comprehensive monitoring and environmental effects study funded by the permittee in an amount not to exceed $500,000. The study program will be developed in concert with representatives of Federal and State agencies having an overview of the Long Island Sound region natural resources and administered by the National Oceanic and Atmospheric Administration under an arrangement acceptable to the Division Engineer. Provisions will be made for participation by a representative segment of the scientific institutions of the Long Island Sound region for information exchange and for integration of these studies with others of a similar nature now under way or being planned. The permittee will designate a point of contact for purposes of coordinating scientific information and administration of this work. In the event the monitoring and environmental effects study reveals the need to change the manner in which the authorized dredging and disposal activity is being performed, the permit may be summarily suspended until the terms and conditions of the permit are modified as appropriate to affect these changes.

Please indicate within 15 days whether you intend to deny or restrict the use of this dump site.

Sincerely yours,

JACKSON

ANDRELIUNAS

MASON

JOHN H. MASON
Colonel, Corps of Engineers
Division Engineer

CF: Division Engineer
Opers Div File-Permits
MFR: Self-explanatory

ENVIRONMENTAL PROTECTION AGENCY

Navy Project to dredge the Thames River and dispose of 2.8 million cubic yards at the New London Disposal Site

April 5, 1974

William S. Rosenberg, Ph.D.
Ocean Disposal Coordinator

Dr. Clifford V. Smith, Jr.
Deputy Regional Administrator

The Navy filed 21 months ago for a permit from the Corps of Engineers to dredge the Thames River and their New London facility in order to allow a newer, larger nuclear submarine to be serviced at this base. A draft EIS was submitted in May 1973 and a final EIS in December 1973. The COE has given public notice and held a public hearing in August 1973 in both New York and Connecticut.

The original choice of a dump site was the Brenton Reef site. Due to the objections raised by Rhode Island, this site was no longer considered. The Navy and the COE then suggested the New London site. This site had been used previously and as recently as November 1972. The use of this site was brought up at the meeting of the Interagency Committee on Dredging in the Long Island Sound (consisting of the COE, EPA, NOAA, BSF&WL, New York, Rhode Island, and Connecticut). Objections were raised by various members of the full committee. A scientific subcommittee was also formed to give guidance to the full committee. EPA's representative is Dr. Don Phelps of the NERWQL. According to Dr. Phelps, the subcommittee did not recommend this site nor did it formally object to it. It is the subcommittee's main function to establish a monitoring program and the criteria for the operation.

Due to the objections to the project, the COE agreed to conduct an extensive monitoring program prior to, during, and post disposal. In addition, the COE agreed to conduct a survey to find an alternate site outside the Sound which will be used if the monitoring program detects a significant adverse impact to the disposal area. The members of the full committee agreed basically to go along with this, although Rhode Island voiced objections. Rhode Island would like the COE to build containment areas or go out to the Navy Ammo Dump Site. The COE has objected to these alternatives on economic grounds.

The COE has given EPA formal notice of its intent to issue the permit to the Navy. Under EPA's authority from PL92-500 Sect. 404, Region I must indicate by April 13 whether it intends to deny or restrict use of this site.

CONCURRENCES

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[illegible]	[illegible]							
[illegible]	WSR/21							

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At a meeting earlier this week, Dr. Schneider of the NMWQL agreed to the use of the New London dump site for the spoils if we included the following restrictions.

1. The disposal operation be conducted as rapidly as possible.

2. All disposal occur at a buoy, the location which Narragansett will choose, so that a cone is formed.

3. The monitoring study now proposed by the subcommittee is used.

4. The site is to be capped by 4-5 inches of clean fill, as defined by the Narragansett Laboratory, upon completion of the project so that a "sanitary sea fill" is created.

Dr. Schneider felt that if these restrictions are imposed the impact to the area will be minimized.

If the Region decides to deny use of the site under Section 404, it must be prepared to prove at a public hearing the disposal at the site will have an unacceptable adverse effect on municipal water supplies, shellfish beds, and fishery areas (including spawning and breeding areas), wildlife, or recreational areas. It was apparent from our meeting with Narragansett personnel that no such hard data is available.

I therefore recommend that the Region approve use of the site. In addi- incorporating Dr. Schneider's restrictions into our approval. tion, the Region also include the following conditions:

1. The COE continues its search for an alternate disposal. The site should be found prior to the commencement of dredging.

2. The full committee as well as the subcommittee is given the opportunity to review the results of monitoring of the disposal operation.

3. The subcommittee is given the authority to set criteria for the determination of adverse impact under which conditions the disposal at the New London site will cease and change to the alternate site.

April 9, 1974

Colonel John H. Mason
Division Engineer
New England Division, Corps of Engineers
U. S. Department of the Army
424 Trapelo Road
Waltham, Massachusetts 02154

Dear Colonel Mason:

In response to your letter of March 27, 1974, this Agency is submitting its recommendations regarding the application of the U. S. Navy (Public Notice dated July 26, 1973) to dispose of 2.8 million cubic yards of dredged spoils from the Thames River in the New London site.

Under section 404 of the Water Pollution Control Act Amendments of 1972, the Environmental Protection Agency is authorized to deny or restrict the use of any defined area for specification as a disposal site when the Administrator determines after notice and opportunity for public hearings that the discharge of such material into such area will have an unacceptable adverse impact on the municipal water supplies, shellfish beds and fishery areas (including spawning and breeding areas), wildlife, or recreational areas.

We are currently unable to demonstrate any unacceptable adverse impact on these marine resources. We therefore cannot deny site specification. However, to insure minimum adverse impact to the marine environment and the surrounding amenities, we request the following conditions be included in our site approval.

1. The disposal operation be conducted as quickly as possible.

2. All disposal occur at a point, marked by a buoy or similar marker, so that a cone-like formation results. The buoy shall be located at 72° 05' 00" W, 41° 16' 03" N.

CONCURRENCES

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[illegible]	[illegible]					
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3. The Corps of Engineers find and begin to study an alternate disposal site prior to the commencement of disposal at the New London site.

4. Upon completion of all disposal of the dredged spoils, the spoils are to be covered with five inches of clean fill.

5. Should an unacceptable adverse impact be detected, the criteria for which are to be set by the Scientific Advisory Subcommittee, the permit shall be summarily suspended, or the disposal operation shall be moved to the alternate site.

We endorse the proposal for a comprehensive monitoring study to be funded by the permittee in an amount not to exceed $500,000. It is our expectation that all developments relating to this project will be coordinated with the committee of Federal and State agencies having the responsibility for the management of the Long Island Sound area.

Sincerely yours,

John A. S. McGlennon
Regional Administrator

WSR:dl

REES/mtm/332

OPERATIONS DIVISION - NED
FILE COPY

NEDOD-P-1

30 April 1974

Mr. John A. S. McGlennon
Regional Administrator
Environmental Protection Agency
John F. Kennedy Federal Building
Boston, Massachusetts 02203

Dear Mr. McGlennon:

Thank you for your recommendations of 9 April 1974 regarding the application of the U.S. Navy to dispose of 2.8 million cubic yards of dredged material at the New London Dump Site.

Recommended Condition Numbers 1, 2, and 5 regarding time, location, provision for suspending use of or relocating the disposal site are being incorporated in the permit. Condition Number 3 is being included in the study program which NOAA will undertake. A further permit condition will provide that disposal at the New London Dumping Ground not be commenced until specific provisions of the study program are finalized.

With regard to Condition Number 4, covering spoils with five inches of clean fill, we expect that the monitoring and study program will indicate what steps, if any, may be necessary to provide adequate protection from degrading the waters of Long Island Sound.

Accordingly, I have issued the subject permit incorporating your recommendations to the fullest possible extent.

MRR

Sincerely yours,

REES

WONG

JOHN H. MASON
Colonel, Corps of Engineers
Division Engineer

CF: Opers Div File-Permits
Division Engineer

MFR: This response to EPA has been informally cleared by OCE Permits Branch and Office of Counsel

MAY 22 1974

Colonel John H. Mason
Division Engineer
New England Division, Corps of Engineers
U.S. Department of the Army
424 Trapelo Road
Waltham, Massachusetts 02154

Re: NEDOD-R-6 (New London dredged materials permit
CT-LOND-74-63 dated April 29, 1974)

Dear Colonel Mason:

This letter is to clarify the status of the recommendations made in John A. S. McGlennon's letter of April 9th to you regarding the subject permit.

Our decision not to formally object to the granting of a permit to the Navy authorizing ocean dumping of dredged materials from the New London channel assumed that our recommendations to minimize adverse environment effects from the dumping would be adopted. Unfortunately, the permit as issued is unclear on this point.

Your letter of April 30th indicates that the permit incorporates these recommendations "to the fullest possible extent," and the language in the permit itself suggests that this may have been effected through the broad general language in the permit. Condition (d) of the permit provides

> (d) That the permittee shall comply promptly with any lawful regulations, conditions, or instructions affecting the structure or work authorized herein if and when issued by the Environmental Protection Agency, Water Quality Office, and/or the State water pollution control agency having jurisdiction, to abate or prevent water pollution, including thermal or radiation pollution. Such regulations, conditions, or instructions in effect or hereafter prescribed by the Environmental Protection Agency, Water Quality Office and/or the State agency are hereby made a condition of this permit. (Emphasis added.)

and conditions(s) and(t) provide

> (s) That the permittee agrees to make every reasonable effort to prosecute the construction or work authorized herein in a manner so as to minimize any adverse impact of the construction or work on fish, wildlife and natural environmental values.

CONCURRENCES

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22May74		22May74	5/22/74	5/22/74			

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(t) That the permittee agrees that it will prosecute the construction or work authorized herein in a manner so as to minimize any degradation of water quality.

These broad provisions seem ample to incorporate the conditions expressed in Mr. McGlennon's April 9th letter if all parties understood this to be the intent. However, since the authority of the Corps of Engineers to issue a permit which fails to incorporate these conditions may be challenged by a citizen suit, and since the letting of contracts for the dredging appears imminent, it is important that there be no misunderstanding on this point.

Accordingly, I would appreciate it if you and the Navy would confirm that the conditions in the April 9th letter fall within the term "lawful conditions or instructions...issued by the Environmental Protection Agency" as used in permit condition (i) and are expressly intended to be a part of the permit. If this is not the case, please call me as soon as possible so that we can schedule the consultation required by the second sentence of section 404(c) of the Federal Water Pollution Control Act, 33 U.S.C. 1344(c), without further delay.

Sincerely yours,

Dr. Clifford V. Smith, Jr.
Acting Regional Administrator

cc: CAPT T. J. Doyle
Acting Commanding Officer, CEC, USN
Naval Facilities Engineering Command
Philadelphia, PA 19112

CONCURRENCES

SYMBOL							
SURNAME							
DATE							

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM, MASSACHUSETTS 02154

REPLY TO
ATTENTION OF:

NEDOD

7 June 1974

Mr. John A.S. McGlennon
Regional Administrator, Region 1
United States Environmental Protection Agency
J.F. Kennedy Federal Building
Boston, Massachusetts 02203

Dear Mr. McGlennon:

This replies to your letter of May 22, 1974 regarding conditions of the New London dredging permit. I agree that we should be clear in our understanding of the intent of your letter of April 9, 1974, and of the permit conditions.

Your letter of April 9, 1974 states that in discharging your responsibilities under provisions of the Federal Water Pollution Control Act Amendments of 1972, the Regional Administrator found no basis for denying or restricting use of the dumping ground. Had site specification been denied, there would have ensued consultation with the Corps, followed by public notice, opportunity for hearing, and a report, all in accordance with provisions of the Act. We therefore issued a permit including those recommendations which we considered capable of fulfillment.

Whether recommendations made other than in accordance with the Act in conjunction with such determinations should be made binding upon the permittee is within the discretion of the permitting agency. In the exercise of our authority, we have incorporated your recommendations to the fullest extent possible in keeping with discussions of the work between our respective agencies during the review period. Further, the permit provides that we may extend or modify conditions, or impose new conditions if considered to be in the public interest.

7 June 1974

NEDOD
Mr. John A.S. McGlennon

Those conditions recommended in your letter but not specifically incorporated require close examination and fuller explanation by the originator prior to their adoption. Inasmuch as the subject of covering dredged materials, let alone locating a source of such materials, has not been brought up during the lengthy review period, its introduction at this stage is presently unacceptable as a permit condition. Even a cursory analysis of the recommended condition Number 4 reveals that its implementation would require the dredging of 500,000 cubic yards of additional material to provide cover. This of itself could be regarded as a major impact and require review under the provisions of NEPA. The same was not true of other conditions recommended.

I do not intend to convey that the above, or any other recommended procedures would not be incorporated if they are justifiable. To this end, I suggest that we discuss this in conference, along with any other areas where we need to clarify our respective authorities. Please let me know if this is an acceptable arrangement to you.

Sincerely yours,

CHARLES J. OSTERNDORF
Colonel, Corps of Engineers
Acting Division Engineer

Copy furnished:
Capt. T. J. Doyle
Acting Commanding Officer, CEC, USN
Naval Facilities Engineering Command
Philadelphia, PA 19112

ENVIRONMENTAL PROTECTION AGENCY

July 2, 1974

Col. John H. Mason
Division Engineer
New England Division Corps of Engineers
424 Trapelo Road
Waltham, Massachusetts 02154

Re: NEDOD-P-6 (New London dredged materials
CT-LOND-74-63 permit dated April 22, 1974.)

Dear Col. Mason:

In regard to Col. Osterndorf's letter of June 7, 1974, I am disappointed that the Corps did not intend that the subject permit incorporate condition 4 recommended in my letter of April 9, 1974. I can appreciate, however, your desire to examine and discuss more fully the need and efficacy of this recommendation before requiring the Navy to adhere to it as a condition of its permit, and I believe the omission of that condition is somewhat rectified by the Corps' reservation of the power to summarily suspend dredging and dumping operations if monitoring and environmental studies reveal a need for such action. Of course, should such studies demonstrate the adverse environmental effects specified in Section 404(c) of the Federal Water Pollution Control Act, EPA could withdraw its specification of the site after public hearing and consultation with the Corps.

I am pleased that the permit provides that "the criteria to determine whether a change in location is necessary will be fully developed prior to commencement of dumping activity," and understand that the Scientific Advisory Sub Committee to the Ad Hoc Joint Federal and State Policy Committee on Ocean Dumping and Dredging is currently developing this criteria. I understand from members of your staff that you intend to afford EPA an opportunity to review the final criteria before they are formally promulgated to the Navy. This seems a reasonable and desirable way of proceeding, since serious disagreements by EPA with regard to the adequacy of those criteria or of compliance with them could lead to EPA withdrawing specification of the site under the circumstances mentioned above.

I am, of course, grateful for your continuing cooperation in this matter.

Sincerely yours,

~~John A. S. McGlennon~~
~~Regional Administrator~~

CONCURRENCES

Capt. JL Doyle
Eric Schneider, Phd

7/1/74 7/1/74 7/1/74 7/1/74 7/1

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DEPARTMENT OF THE NAVY

REVISED DRAFT

ENVIRONMENTAL IMPACT STATEMENT

[Excerpts]

NAVAL SUBMARINE BASE, NEW LONDON, CONNECTICUT

DREDGE RIVER CHANNEL

PREPARED BY:

ECOSYSTEMS DIVISION
JASON M. CORTELL & ASSOCIATES
WELLESLEY HILLS, MASS.

MAY, 1973

1. PROPOSED ACTION

1.01. Nature of the Proposal. This statement details the project of the United States Navy in New London and Groton, Connecticut and nearshore areas under the jurisdiction of the States of Connecticut, New York, and Rhode Island. It is proposed to dredge certain portions of the Thames River and spoil the material in the Rhode Island Sound dump site, as detailed in Sections 1.02 through 1.12 below. In compliance with the intent of the National Environmental Policy Act of 1969, and various Department of Defense directives, this project can be considered an action requiring the preparation of an Environmental Impact Statement. Among factors considered by the Navy in the preparation of Environmental Statements are conservation, economics, aesthetics, historic values, fish and wildlife resources, flood damage prevention, navigation, recreation, water supply and water quality, and, in general, the needs and welfare of the people. This Statement addresses those considerations above mentioned.

1.02. Project Description. The project, for purposes of clarity and ease of environmental assessment can be broken down into three categories: (1) channel widening and deepening; (2) widening and deepening the approaches to the State Pier and the Naval Underwater Systems Center; (3) spoil disposal.

1.03. Widening and Deepening the Channel, as shown in Figures 1 and 2a, b and c, consists of dredging the Thames River Channel to a depth of 37 feet from the U.S. Naval Submarine Base, New London, Groton, Connecticut, to the mouth of the River in Long Island Sound, a distance of approximately 7.5 miles. The channel was last dredged to a depth of 33 feet in 1965. The present controlling depths in New London Harbor are 32 feet in the authorized 33 foot entrance channel and 33 feet from just above the railroad bridge to the submarine base.

1.04. Dredging is proposed to commence in fiscal year 1973 and will require two years to complete. The entire dredging project will be accomplished in two increments. In the first, occurring in fiscal year 1973, the channel will be widened and deepened to 37 feet from station 184+04 (near the State Pier) to Station 396+04 (mouth of channel), a distance of 21,000 feet. The second increment of channel dredging, planned for fiscal year 1974, widens and deepens the channel from Station 0+00 (Submarine base) to Station 140+45 (near Gold Star Memorial Bridge) a distance of 14,045 feet. Maximum dredge depth for both increments is 37 feet. Width varies from 300 feet to new 600 foot (average) from the submarine base to the railroad bridge and 500 feet from the bridge to Long Island Sound. The amount of material to be removed from widening and deepening the channel is 2,361,915 cubic yards.

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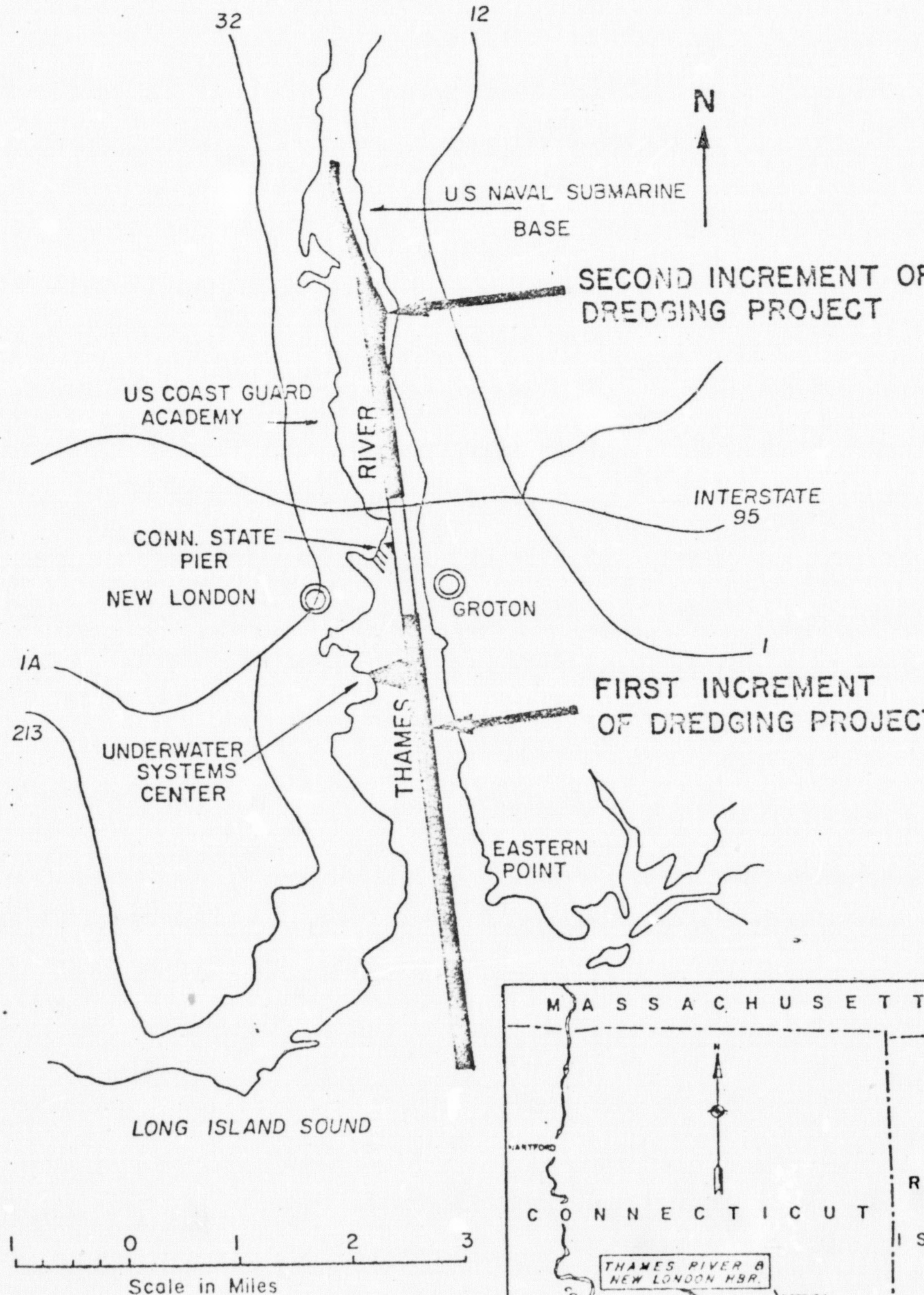


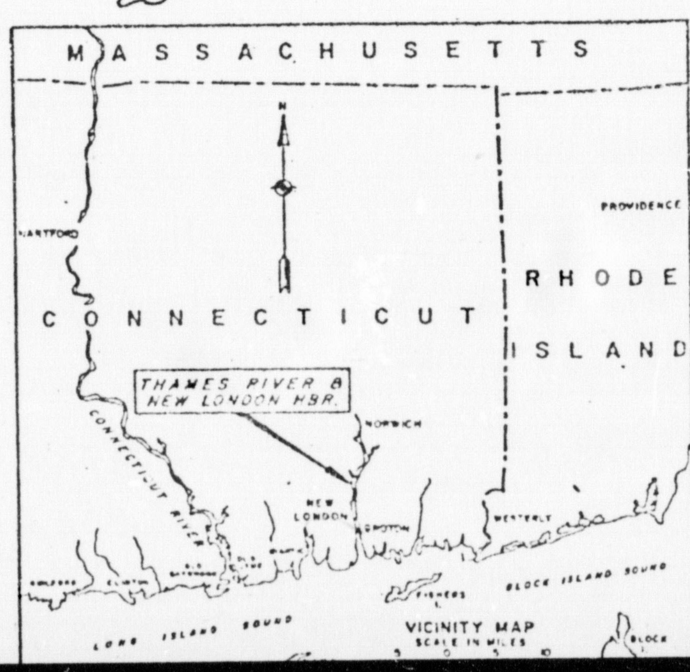


Figure 1
GENERAL SITE PLAN

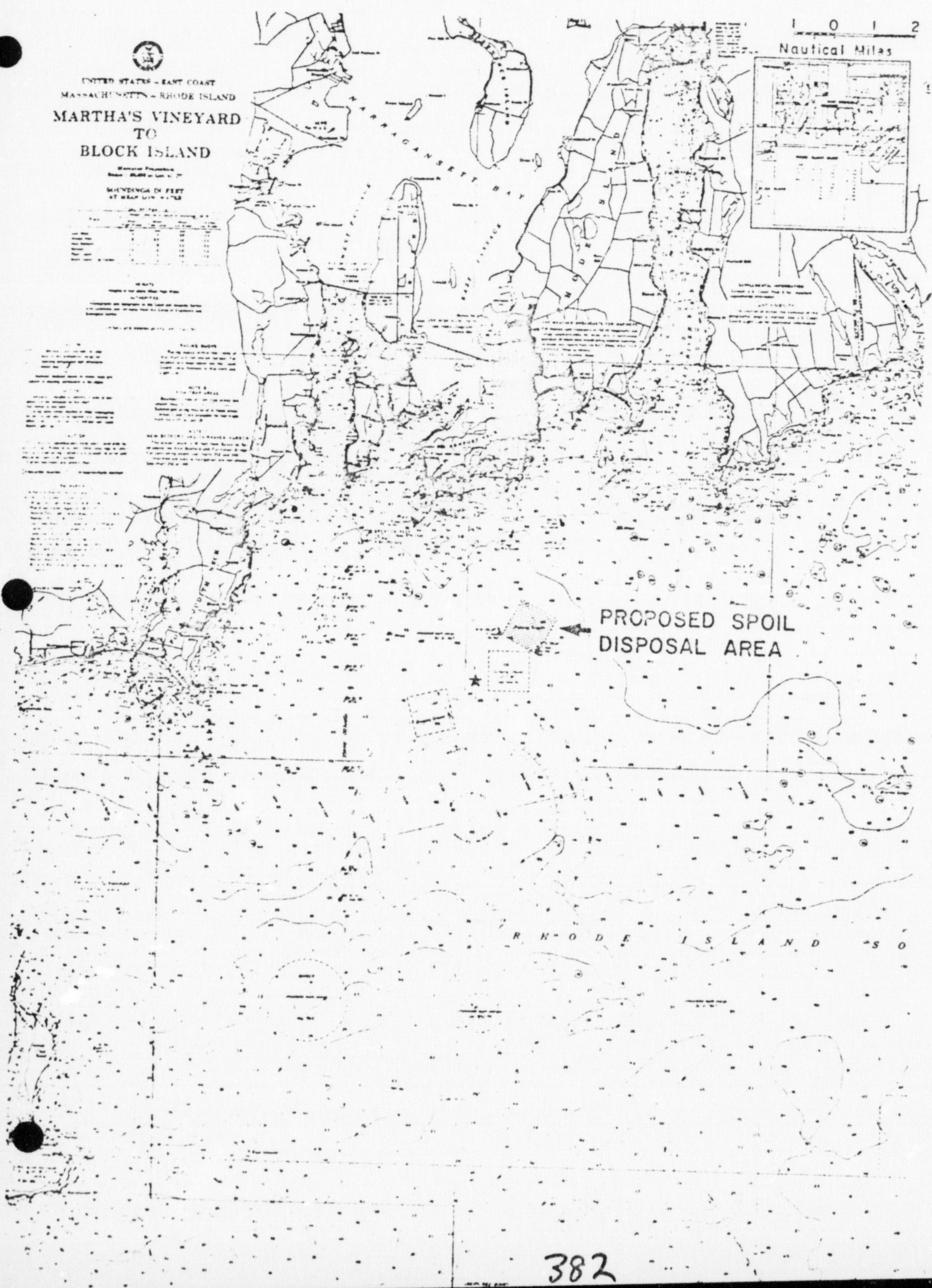
1.05. Widening and deepening the approaches to the State Pier and Underwater Systems Center is proposed for the first increment of work in Fiscal Year 1973. The areas proposed to be dredged to 39 feet in depth are shown in Figure 2b. Existing depth in the Underwater Systems Center area averages 32 feet. Width varies from 280 feet at the shore end of the pier to 1300 feet wide at the River Channel line. Existing depth at the approach to the State Pier averages 35 feet. Width varies decreasing from 800 feet at the inboard end of the pier to zero at the River Channel approximately 1800 feet in length. The amount of material to be removed from widening and deepening the approaches to the State Pier and Underwater Systems Center is 400,322 cubic yards.

1.06. A total of 2,762,237 cubic yards of organic silt (river mud) will be removed in this project.

1.07. The dredging will be conducted by using an 18 to 20 cubic yard bucket and a 4000 cubic yard capacity scow with mechanisms to drop the entire load at one time to maximize cohesion of the dumped mass and minimize turbidity increases and indirect changes in water quality. Environmental studies conducted on the excavate materials (Sections 2.06a, 2.06b, 2.06c) have shown the materials to best be handled in this manner to minimize environmental effects. Time of operations shall be continuous for two years, as the data on ongoing excavation within the Thames indicates no significant change in water quality that could adversely effect the migration of anadromous or catadromous species. None the less, should actual field operating conditions prove other than those anticipated such that fisheries are being adversely affected, the operations schedule will be modified to insure against environmental damage.

1.08. Spoil Disposal. Upon a thorough investigation of alternatives to the proposed project and alternative disposal methods, dumping of the spoils in ocean areas has been determined to be the most feasible and least environmentally disruptive method to accomplish the proposed action. Of the alternative ocean dumping sites, areas of containment seem to be the most prudent in light of the state of knowledge of the impacts to the marine ecosystem. Of the several containment sites, the most environmentally suited for the material to be disposed of is the previously spoiled dump site in Rhode Island Sound shown on Figure 3. Between 1967 and 1970 a total of 8.2 million cubic yards of dredge spoil was deposited and monitored in the site. Informal discussion with the Corps of Engineers indicates the dump site has the capacity to accept the spoil from the Navy's project. The proposed project will utilize this dump site for disposal of the 2.7 million cubic yards of material to be excavated from the Thames River, New London Harbor area.

1.09. The choice of the proposed dump site was an outgrowth of the integration of the many comments received on the draft copy of this statement, further investigation into the physical, chemical, and biological properties of Block Island Sound and Eastern Long Island Sound, and the necessities of National Defense which require a capability for operating SSN 688 class submarines out of the New London area. More specifically, the United States Department of the Interior had the following comments:


UNITED STATES – EAST COAST
MASSACHUSETTS – RHODE ISLAND
MARTHA'S VINEYARD
TO
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PROPOSED SPOIL
DISPOSAL AREA
RHODE ISLAND SO

"We feel that a project of this magnitude with the capability of significant environmental degradation must be conducted only in conjunction with a study to determine the biological effects of the project. Major categories which should be included in such a study are the change in species composition and numbers within the dump area and investigations of the environmental changes in adjacent areas. To this end, biological inventories should be conducted before, during, and after dumping activities to assess the biological populations within and adjacent to the spoil site. Long-range monitoring of the chemical, physical and biological characteristics of the dump site and adjacent areas should be made to determine the stability of polluted materials in the dump zone."

In addition, the Environmental Protection Agency commented that:

"A site, however, has not yet been chosen or approved. We recommend that the material be disposed outside of the Long Island Sound, as recommended by the Long Island Sound Enforcement Conference of 1971. A detailed environmental analysis should be done on alternative ocean disposal sites. We suggest that bottom samples be taken at this time to provide background information on the effect of the dredged material."

As a result of the comments, additional investigations of existing data and a minor amount of generated data in the Block Island Sound area have preliminarily identified potentially acceptable containment sites, in particular, the deep ocean basins to the south and east of Fisher's Island. It was ascertained, however, during the course of investigations for the preparation of this statement, that the level of existing data was not of sufficient detail to be able to accurately assess the impact of dumping within Block Island Sound. Nor was time available to generate adequate predisposal studies within the timetable mandated by the interests of National Defense. It was, therefore, decided to utilize, as the reviewers had suggested, an existing spoil dumpsite. The University of Rhode Island has made extensive pre and post-disposal studies, again as the reviewers had desired, in the subject area and report:

"An area one nautical mile square (Latitude 41°23'25" and Longitude 71°17'58") was examined to obtain information on: a) site conditions prior to disposal, b) observations during actual dumping operations, and c) effects of dredged material on economically important marine resources in its vicinity. Results of observations and experiments were analyzed and it was concluded that the site studied was acceptable from the point of view of minimizing damage to locally important marine resources."

1.10 The Army Corps of Engineers, as part of their proposed future public works project for the New London Harbor, have submitted to Congress a proposal in the amount of $500,000 to conduct the necessary detailed predisposal studies in Block Island Sound and environs. This project, involving at least a year's time before any conclusions can be reached as to the suitability of the area for spoils disposal, will probably coincide with the Navy's work, if approved.

1.11. Utilization of the University of Rhode Island offshore dump site study area will be continued until an alternate site in Block Island Sound is found to be more environmentally suitable. Such results might be available within twenty four to twenty six months after the commencement of studies either by the Army Corps or another Federal or State agency. At present, only the Corps of Engineers is contemplating such a study. Should a change in dump site be indicated, a revised permit will be submitted to comply with existing regulations. In any event the Navy will direct its spoil dumping activities to that area found to be the least environmentally disruptive.

1.11a. In compliance with the National Environmental Policy Act, the State of Rhode Island and appropriate agencies within the State have been advised of the proposed action and future alternatives to spoil disposal as described above in order to maintain coordination during the preparation of this Revised Draft Environmental Impact Statement.

1.12. Project costs had been estimated at approximately $9,921,000 to accomplish the work described in Sections 1.02 through 1.08 with disposal in the original Block Channel location ± 23 nautical miles southeast from the mouth of the Thames River. The proposed utilization of the more distant but environmentally more suitable Rhode Island Sound dump site is estimated to add an additional cost to the project of between $220,000 and $330,000.

2.10 Block Island Sound and Eastern Long Island Sound. Block Island Sound lies on the southern coast of New England between Rhode Island Sound and Cape Cod on the east and Long Island on the west. Block Island Sound is a deep, navigable body of water which forms the eastern approach to Long Island Sound, through a passage known as the Race. The Sound opens on the east into Rhode Island Sound and on the south into the Atlantic Ocean. The axis of Block Island Sound extends in a northeasterly-southwesterly direction, with a maximum length of approximately 32 nautical miles from Point Judith, Rhode Island, to Gardiner's Island, New York and maximum width of approximately 13 nautical miles from Watch Hill, Rhode Island to Montauk Point, Long Island.

2.10a. The western and eastern boundaries of the Sound are made up of islands, the largest being Block Island on the east. Block Island is located eight miles southwest of Point Judith and is five miles long and from one to three miles wide. A chain of islands, stretching between Watch Hill, Rhode Island ~~and~~ Orient Point, Long Island, make up the western boundary of the Sound. The southern coast of Rhode Island from Watch Hill to Point Judith forms the northern boundary (104).

2.10b. Long Island Sound is generally defined as being that body of water bounded by the northern coast of Long Island on the south and the Connecticut shoreline on the north. The eastern end of the Sound can be visualized as a line connecting Watch Hill Point in Rhode Island to Orient Point on Long Island. The western entrance is considered to be through the section connecting Throgs Neck with Willitts Point (112).

2.11. Inventory of Surface Waters, Quantitative Aspects. No dumping is proposed for Long Island Sound, but its current patterns are covered both for the sake of completeness and because of the influence that Long Island Sound has on currents in neighboring Block Island Sound.

2.11a. Long Island Sound may be best characterized as an oscillating tidal basin (112). That is to say that tidal variations tend to manifest themselves as essentially standing waves whose wavelength is four times the length of the Sound. The physical manifestations of this are that the Race (at the mouth of the Sound) exhibits a low tidal range and high velocities (up to five knots), while Throgs Neck has a large range but relatively low velocities.

2.11b. In addition to the very large current velocities at the mouth of the Sound, there are two other interesting points concerning tidal circulation in Long Island Sound. First, both the work of Swanson (112) and earlier of Riley (89) indicate that near the center of Long Island the current is rotary in nature, with a definite circular pattern to the surface flows averaged over many tidal cycles. Second, Hollman and Sandberg (50) indicate that there is a bottom to top rotary motion, as well. This is expressed by the fact that bottom drifters released in Long Island moved northwesterly, while surface drifters moved in a

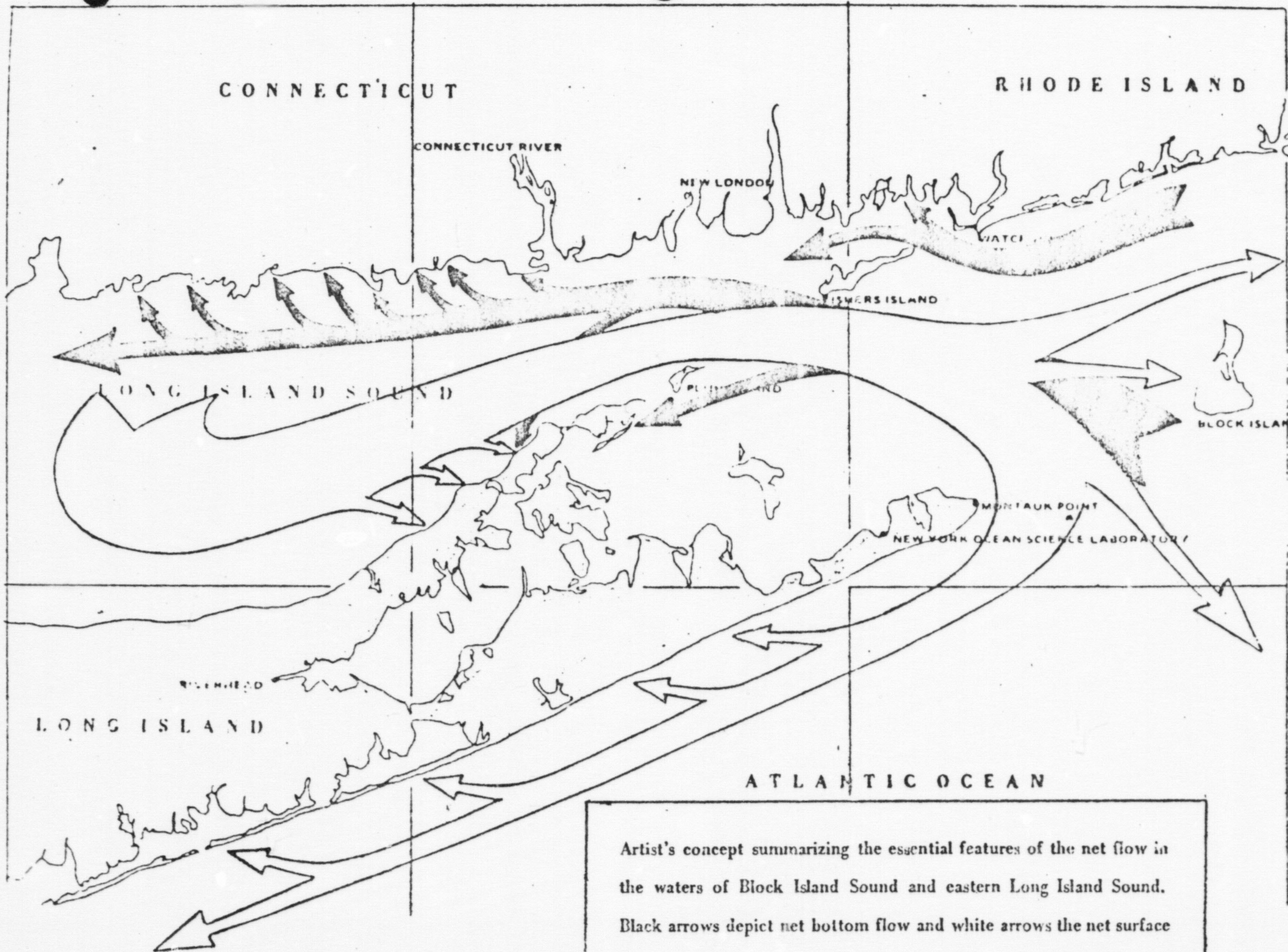
generally easterly direction. Figure 21, taken from Hollman and Sandberg, illustrates this clearly.

2.11c. The net effect of these trends is that Long Island Sound is a poor disposal area. Current patterns tend to retain pollutants in the Sound and gradually move them shoreward.

2.11d. Currents Within Block Island Sound. The current patterns in Block Island Sound have been extensively surveyed (68,50,89,104,31,65). These many surveys deal with two major aspects of flows within Block Island Sound; the instantaneous flow, which is essentially the velocity and direction of flow at a given location and depth, and the net flow, which is the time averaged flow of water through the Sound. The instantaneous flow patterns are due to the tidal currents and are well known as far as surface velocities are concerned. The net flow, or residual drift, has been studied by Hollman and Sandberg (50) and sheds light on the long term movements of water within the Sound.

2.11e. Tidal Currents. The tidal currents which sweep through Block Island Sound are among the swiftest on the East Coast. In the constricted area known as the Race, the U.S. Coast and Geodetic Survey Tidal Current chart for Long Island and Block Island Sounds (Fig. 22) shows a maximum ebb velocity of 5.2 knots and a maximum flood velocity of 4.0 knots. In the constriction between Fisher's Island and Napatree Point, the velocity reaches 2.5 knots and where the currents sweep out around Montauk Point and Block Island the velocity again reaches 2.5 knots. The currents in the central and west central parts of the Sound average about 1.5 knots. The ebb currents diverge around Block Island leaving the area west of the Island with surface currents of less than one knot. The flood currents flow around Block Island and this same area, which is now in the lee of the island, once again has currents of less than one knot (104). These tidal currents were measured at the surface, but Nalwalk et al (68) indicate that currents of comparable magnitude may be expected at the bottom of Block Island Sound. Their results showed that, for three locations in Block Island Sound, the bottom currents were often at different directions than the top currents, but that the speeds were very nearly equal. Their data indicates that bottom current velocities may be safely assessed by assuming that they are equal to the surface velocities. It should be noted, however, that it would not be correct to assume that bottom current directions may be assessed from surface data. The bottom currents of Block Island Sound have not been sufficiently mapped to allow accurate predictions of direction.

2.11f. Non-Tidal Circulation. The large magnitude of the tidal velocities and their cyclic nature tend to obscure the non-tidal circulations in any estuary. This is the case in Block Island Sound, but these circulations, fortunately, can be measured. A simple and direct method of measuring time averaged circulation, or residual drift, is the use of surface and bottom drifters with return cards attached



Artist's concept summarizing the essential features of the net flow in the waters of Block Island Sound and eastern Long Island Sound. Black arrows depict net bottom flow and white arrows the net surface flow.

Figure 25

From Hollman and Sandberg

2.18. Rhode Island Sound. Rhode Island Sound may be defined as that body of water bounded on the north by Narragansett Bay, on the west by Block Island Sound, on the east by Buzzards Bay and Vineyard Sound and on the south by a line between Block Island and Martha's Vineyard. It is a continuation of the system composed of Long Island Sound and Block Island Sound and although it has not been as extensively studied, it may be assumed to share many features in common with these two sounds.

2.19. Inventory of Surface Waters, Quantitative Aspects. Detailed current studies are limited for the major portion of Rhode Island Sound, but studies in adjacent areas shed some light on tidal and non-tidal circulations. Saila, Pratt and Polgar (96), however, have conducted more intensive bottom current investigations at the proposed dump site.

2.19a. Tidal Circulation. Coast and Geodetic Survey tide charts for Block Island Sound, Narragansett Bay and adjacent Massachusetts waters indicate expected surface velocities at the narrows leading into Rhode Island Sound. These expected velocities are:

Mouth of Vineyard Sound	-	2.3 knots
Mouth of Buzzards Bay	-	1.4 knots
Mouth of Block Island	-	2.5 knots
Mouth of Narragansett Bay	-	1.2 knots

2.19b. Tidal velocities in the central portions of the Sound may be inferred to be on the order of 1.0 knots by comparison to central Block Island Sound. There are extremely limited bottom current velocity data for Rhode Island Sound, but data by Saila et al (96) for an area off Point Judith indicates that normal bottom velocities might be about 0.10 knots with occasional values up to 0.50 knots.

2.19c. Non-Tidal Circulation. Cook (11) used drift bottles and bottom drifters to study non-tidal circulation in Rhode Island Sound. His results were similar to those found by Hollman and Sandberg (50) for Block Island Sound and indicate that Rhode Island Sound is part of the same flow system. The net surface drift tends to be eastward with a strong north-south component induced by Narragansett Bay. The bottom drift tends westward with a north-south component and joins the westward flow through Block Island Sound and into Long Island Sound. In addition to these gross movements, Shonting (107) has deduced the presence of deep water eddies with scales on the order of 1 kilometer in the Sound. Cook (11) during his drifter experiment, noticed what seemed to be an intermittent large-scale eddy encompassing most of northern Rhode Island Sound.

2.19d. Thus, it appears that the tidal and non-tidal circulation in the major portion of Rhode Island Sound is not well-known, but can be estimated with resonable confidence from the existing data. Data from the University of Rhode Island on the proposed dump site indicate current velocities to be more studied than any other alternative disposal site, and that the values are to be acceptable for retaining spoil materials after emplacement.

"Primary grain size analyses suggest that a predominant clay type of sediment is not accumulating within the limits of the offshore area and that clay size material is not even a significant component of the finest sediments within the innermost limits of this shelf location. Apparently the sediment source deposits that are being reworked or were reworked previously either lacked clay or most of the clay was transported outside the region. In addition, what little clay is being removed from the Bay system is carried for the most part beyond the limits of the region before it is deposited.

"There is some relationship between bottom configuration and sediment type in this area. For example, the extensive area of fine sediment which is located near Point Judith lies along the base of the curving western slope of the semi-basin which is found adjacent to the entrances to East and West Passages. The irregular tongue of silty sand leading toward the southwest follows the base of this curving slope westward toward Block Island Sound.

"The submarine trunk valley which crosses the area from the northeast toward the southwest in the vicinity of latitude 41°21'N and longitude 71°W contains several patches of fine sediment. The larger patch, located at the eastern edge of the area, lies at the junction of valleys leading toward Buzzards Bay to the north and Vineyard Sound to the northeast. Small patches of fine sediment are also found at two locations in the trunk valley near the deeper depths toward the southwest."

2.22a. There is little information as to the skewness of the grain size curves for the majority of Rhode Island Sound, but by analogy to Block Island Sound it may be assumed that areas of fine sediments are aggrading while areas which are predominately coarse sediments are undergoing erosion to a greater or lesser extent. The areas of fine sediments are limited to the area off Point Judith and another area in the eastern portion of Rhode Island Sound. The proposed dump site is within an area having fine sediments indicating favorable conditions for retention of dredge spoil.

2.22b. Due to the lack of information on currents and the general nature of the sediment information, it is not possible to identify all potential disposal areas within Rhode Island Sound. However, a few areas can be identified and classified as either sites where the spoils can be expected to disperse or areas where the spoils can be expected to be contained.

2.22c. Areas which can be expected to meet the criteria for containing spoils are limited to the areas off Point Judith. This area contains the Dump Site to be utilized as shown on Figure 3. The Saila, et al study (98) of actual dumping in this area has shown that containment is achieved in this area. This provides convincing evidence as to the acceptability of this area if containment of the spoils is desirable. Not enough is known about the other area of fine sediments shown on Figure 30 to recommend it as a potential dump site, although it is likely that it would be acceptable.

5. ALTERNATIVES TO THE PROPOSED ACTION

5.01. Do-Nothing. The adverse effects associated with dredging and disposal of spoil would be avoided if the project is not implemented. The effect on the National Defense, however, would be incalculable since the new SSN 688 class submarine would be unable to utilize the facilities at the New London Submarine Base for full tactical development of the craft. Secondly, indirect economic benefits to other shipping would not be realized nor would currently hazardous navigation conditions north of the Route 95 bridge be corrected.

5.02. Alternative Locations for the SSN 688. The basic purposes of the proposed project, as indicated in paragraphs 1.13 through 1.15, require that Submarine Base, New London, be capable of supporting SSN 688 class submarines. It has been estimated to furnish another site with the facilities existent at New London would require an expenditure of 150 million dollars in addition to the cost of adequate piers and a new submarine tender. Total cost for the New London project, as indicated in this report, is approximately 10 million dollars.

5.02.a. Secondly, the only Development Group that can fully develop the tactical ability of the SSN 688 is located in New London and their work is to be executed at the Underwater Sound Systems Lab utilizing the State Pier to outfit the craft.

5.02.b. In summary, the total investment already made in the facilities located on the Thames River that would have to be duplicated elsewhere is 184 million dollars.

5.03. Alternative Dredging Methods. The question often arises as to which dredge type or method is least environmentally damaging. The Corps of Engineers states that there is no known dredge which can operate without creating some environmental disruptions. However, because of man's use of his environment, dredging is still a necessity.

5.03.a. Basically, according to the Corps of Engineers, hydraulic and bucket (clamshell, orange peel or clipper dredges) are used in the maintenance of New England rivers and harbors.

5.03.b. The hydraulic dredge operates on a vacuum principle and consists essentially of a centrifugal pump which draws in a mixture of water and sediment. This mixture is generally composed of 80% to 90% water and only 10% to 20% excavated material. The spoil is discharged through a pipeline system to either a land-based spoil bank or barge. Very little visible water surface effects are produced by pipeline to land spoil disposal. The turbidity plume created by the hydraulic pipeline dredge is the major objection to its use. Spill-over back into the water can occur if the spoil discharge area is not properly diked. Navigation can temporarily be obstructed by the pipeline system.

sites have been investigated on the basis of existing and

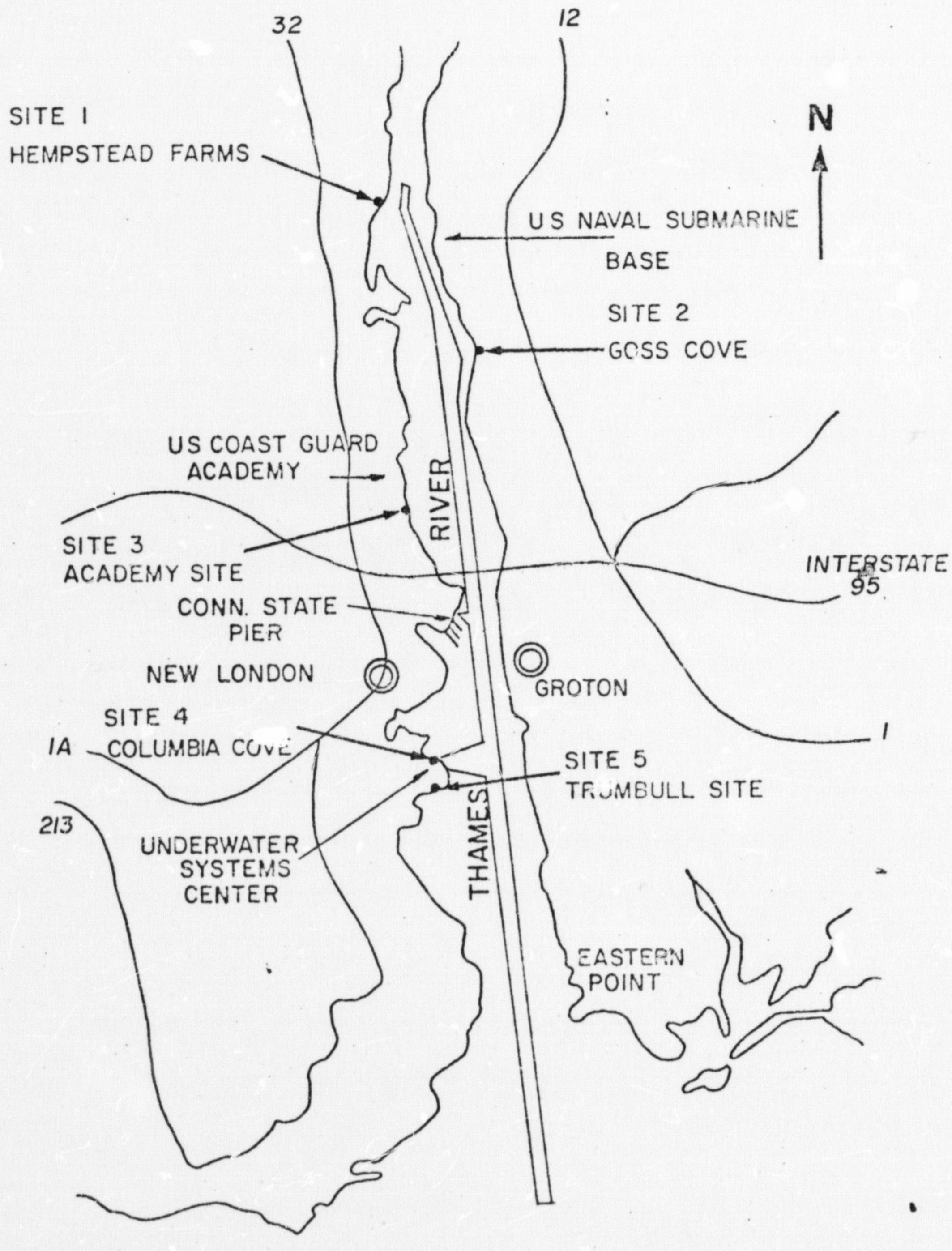


Figure 36
LOCATION OF ALTERNATIVE
LAND DISPOSAL SITES

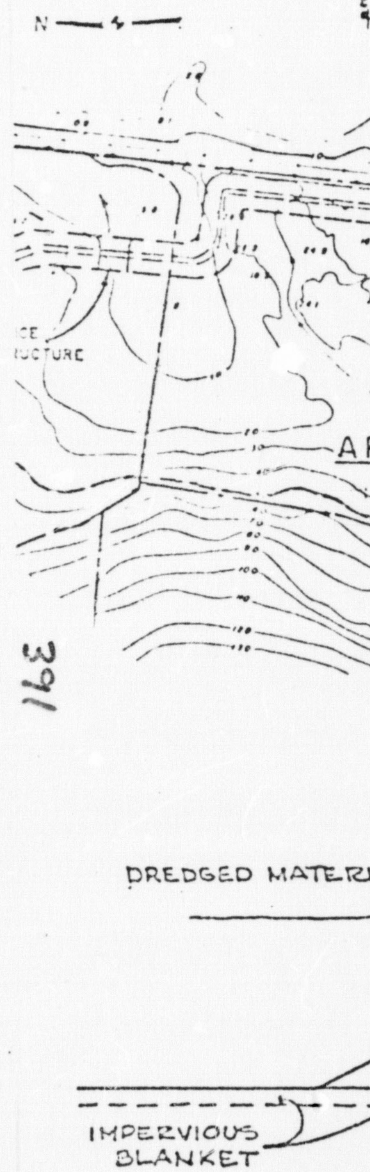


Figure 37

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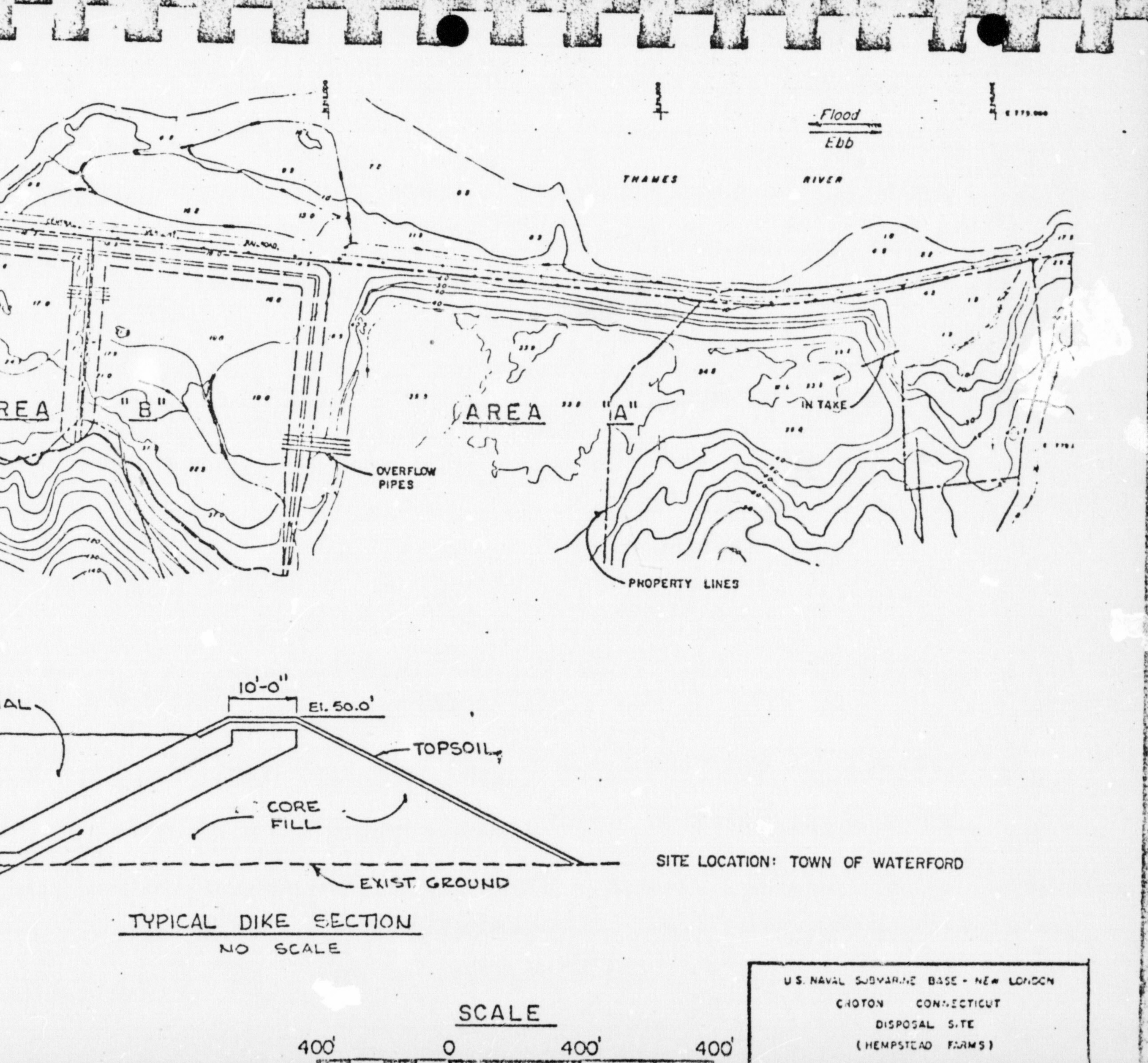
3.04. s. The impacts of spoils dumping on these tiny



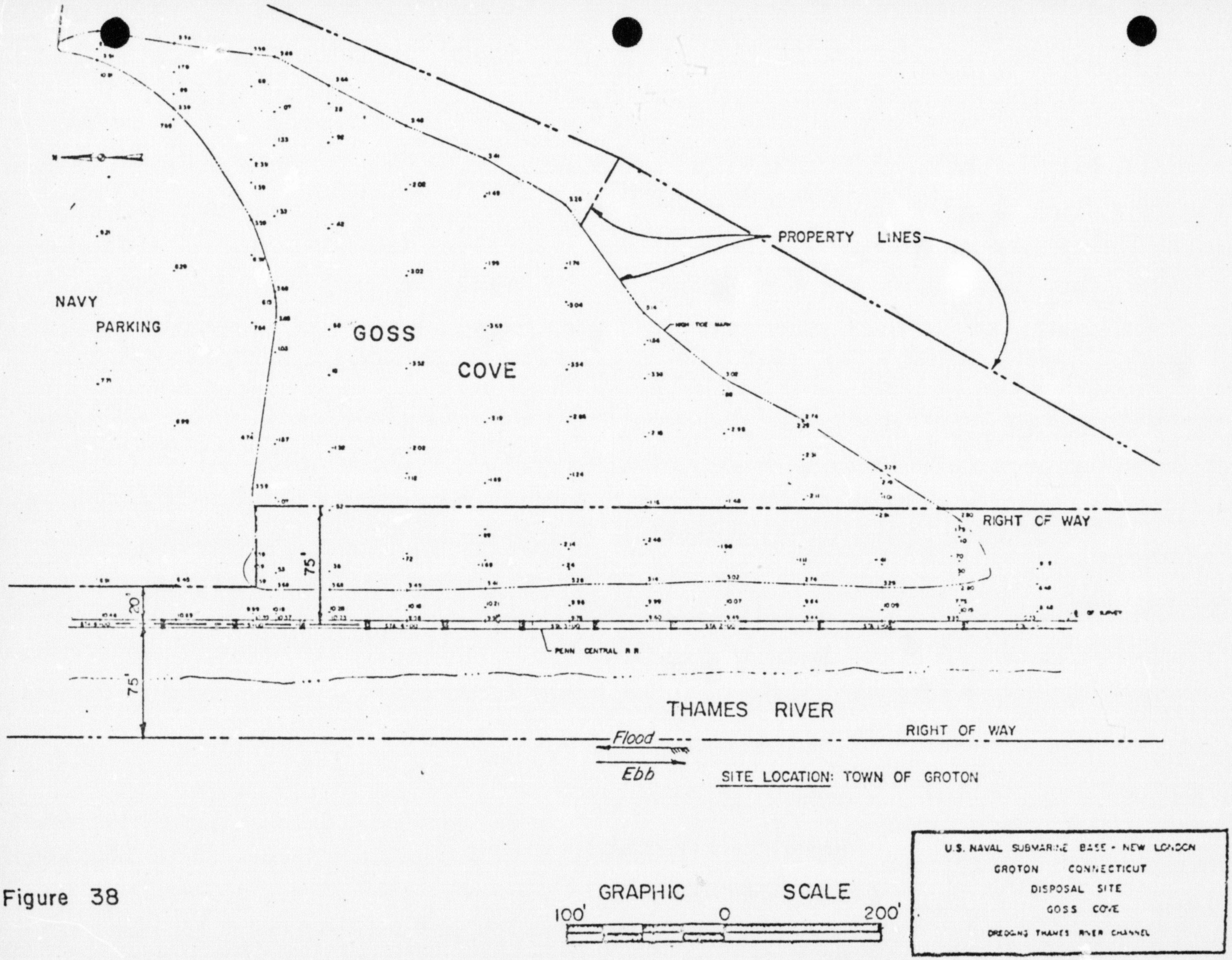

NAVY
PARKING
GOSS
COVE
PROPERTY LINES
RIGHT OF WAY
75'
20'
PENN CENTRAL R.R.
75'
THAMES RIVER
RIGHT OF WAY
Flood
Ebb
SITE LOCATION: TOWN OF GROTON
U.S. NAVAL SUBMARINE BASE - NEW LONDON
GROTON CONNECTICUT
DISPOSAL SITE
GOSS COVE
DREDGING THAMES RIVER CHANNEL
GRAPHIC SCALE
100' 0 200'

Figure 38

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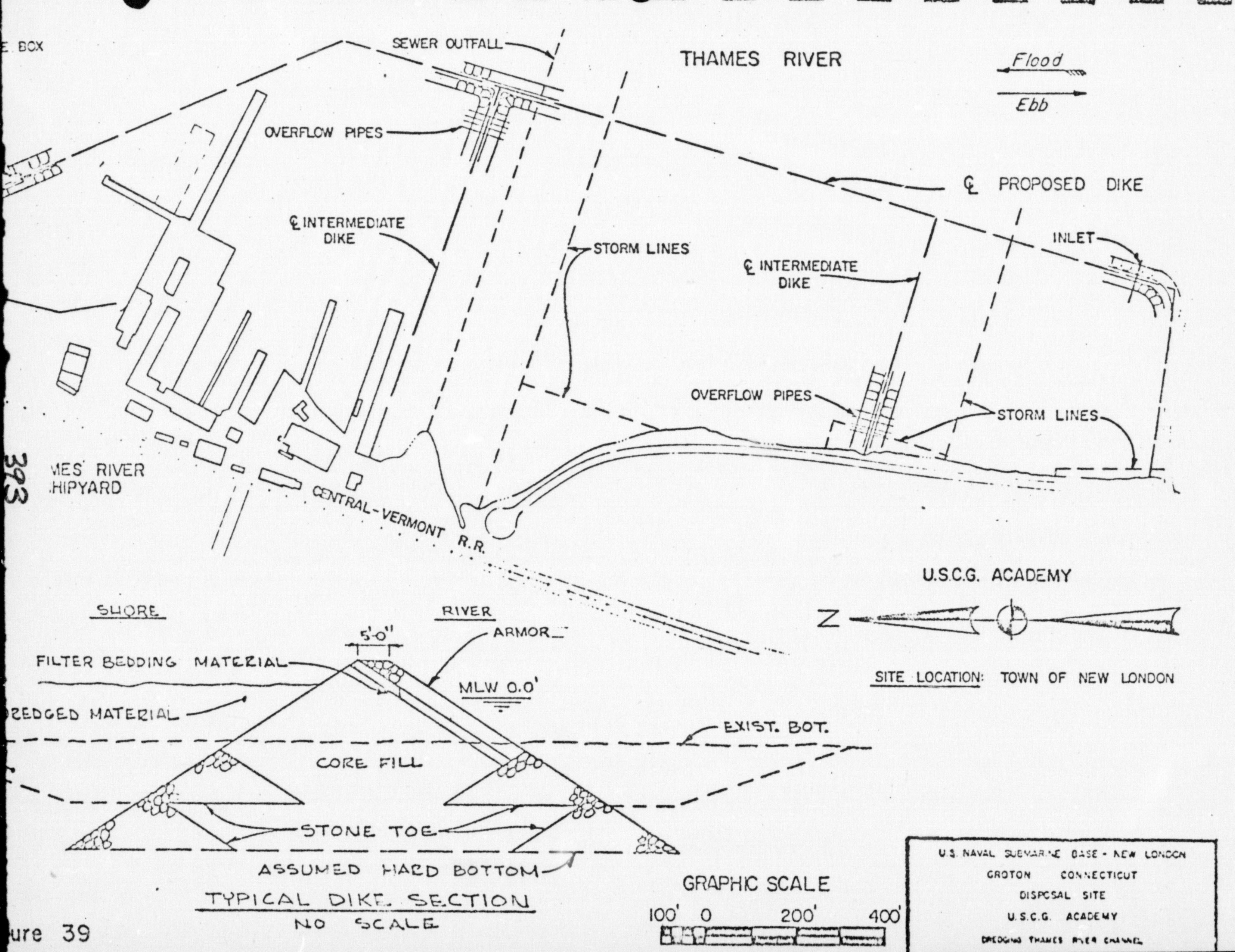
E. BOX
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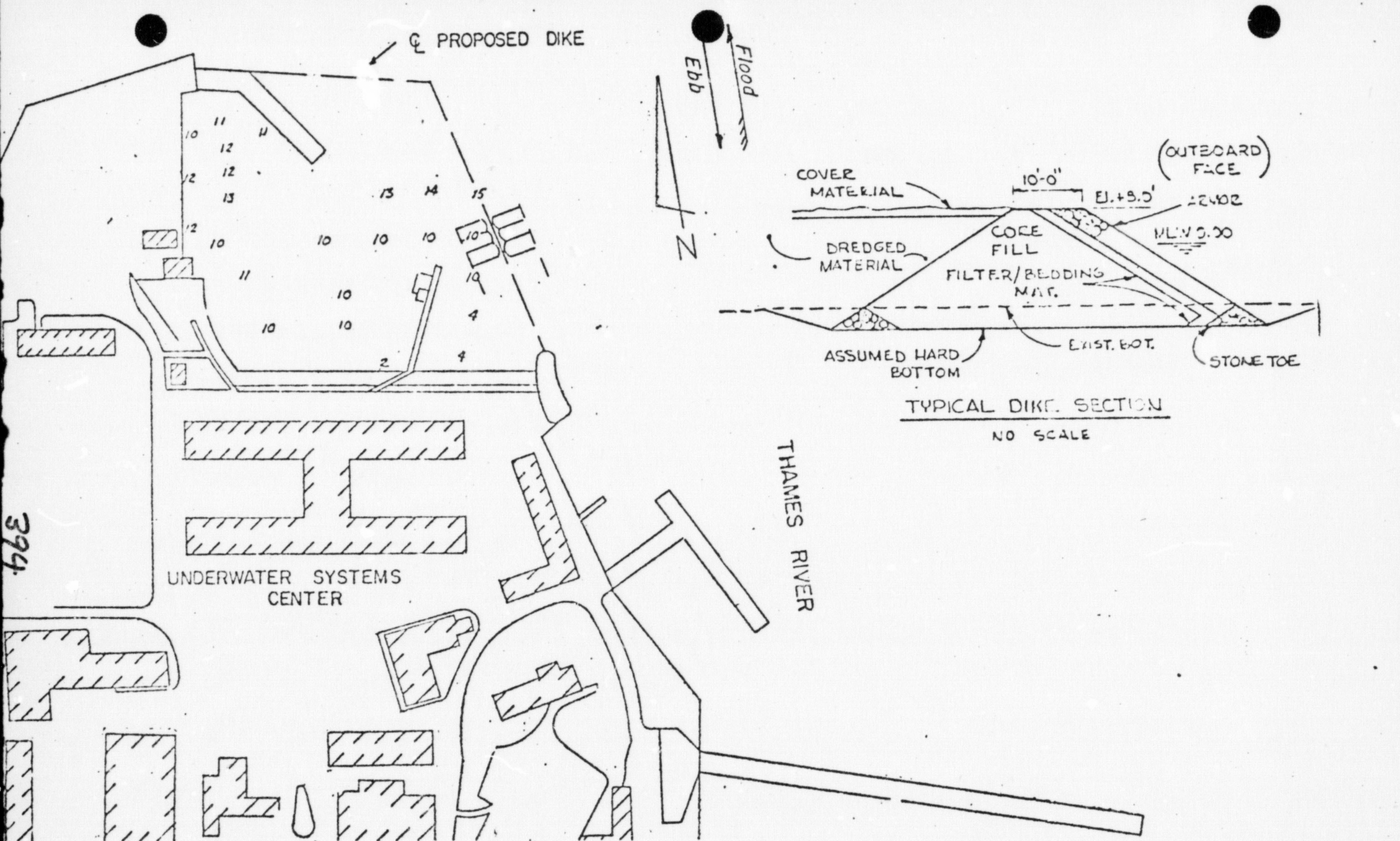
STORM LINES
MES RIVER
HIPYARD
CENTRAL-VERMONT R.R.
U.S.C.G. ACADEMY
Z
SITE LOCATION: TOWN OF NEW LONDON
SHORE
RIVER
5'-0"
ARMOR
FILTER BEDDING MATERIAL
MLW 0.0'
DREDGED MATERIAL
EXIST. BOT.
CORE FILL
STONE TOE
ASSUMED HARD BOTTOM
TYPICAL DIKE SECTION
NO SCALE
GRAPHIC SCALE
100' 0 200' 400'
U.S. NAVAL SUBMARINE BASE - NEW LONDON
GROTON CONNECTICUT
DISPOSAL SITE
U.S.C.G. ACADEMY
DREDGING THAMES RIVER CHANNEL

ure 39



SITE LOCATION: TOWN OF NEW LONDON

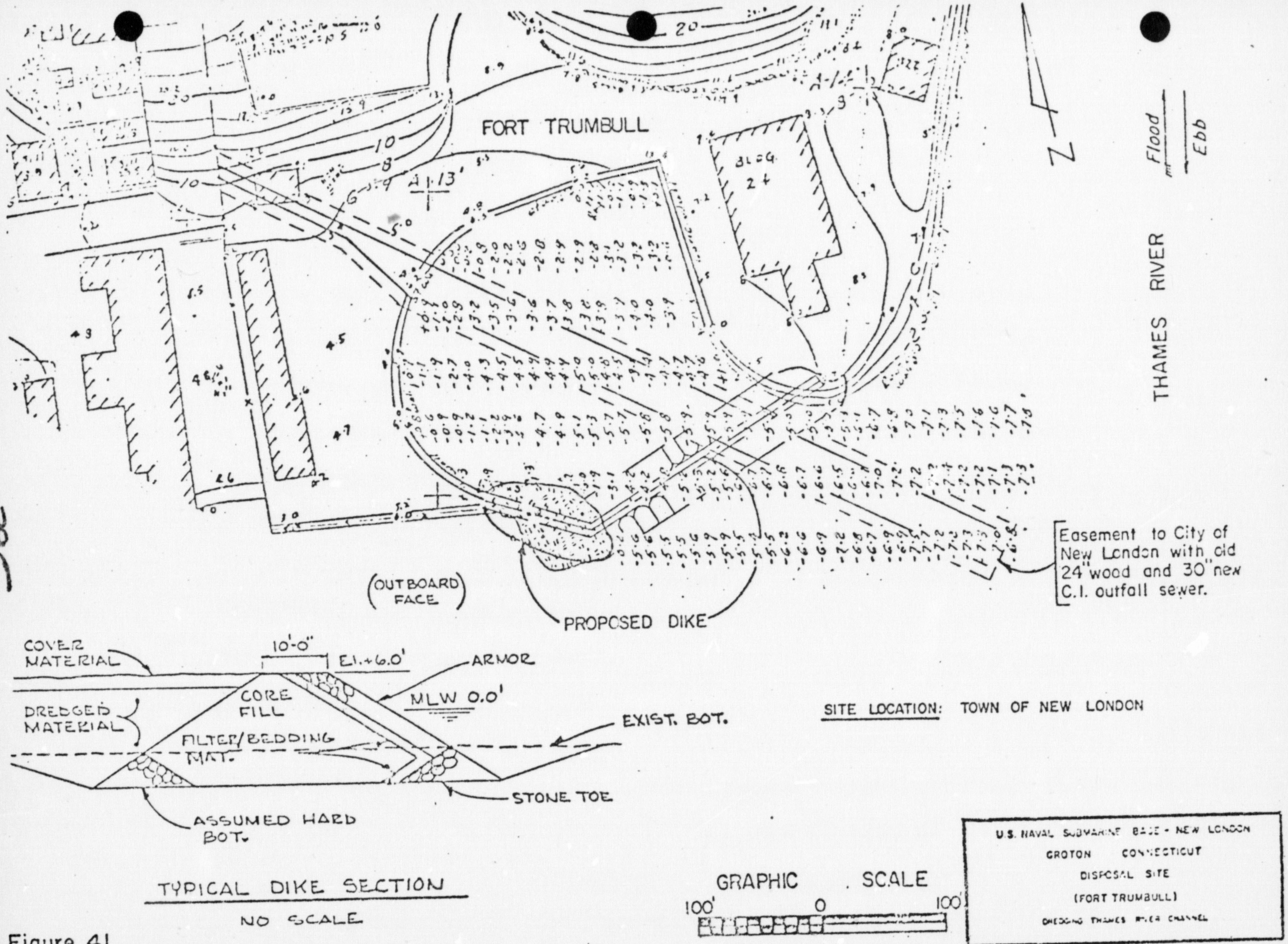
GRAPHIC SCALE

200' 100' 0 200'

U.S. NAVAL SUBMARINE BASE - NEW LONDON
GROTON CONNECTICUT
DISPOSAL SITE
COLUMBIA COVE
DREDGING THAMES RIVER CHANNEL

Figure 40

394



FORT TRUMBULL
BLDG 24
THAMES RIVER
Flood
Ebb
Easement to City of New London with old 24" wood and 30" new C.I. outfall sewer.
(OUTBOARD FACE)
PROPOSED DIKE
COVER MATERIAL
10'-0"
El. +6.0'
ARMOR
CORE FILL
MLW 0.0'
DREDGED MATERIAL
FILTER/BEDDING MAT.
EXIST. BOT.
STONE TOE
ASSUMED HARD BOT.
TYPICAL DIKE SECTION
NO SCALE
SITE LOCATION: TOWN OF NEW LONDON
GRAPHIC SCALE
100' 0 100'
U.S. NAVAL SUBMARINE BASE - NEW LONDON
GROTON CONNECTICUT
DISPOSAL SITE
(FORT TRUMBULL)

Figure 41

5.03.c. All dredge types disrupt the bottom habitat, smother or damage benthic organisms and release sediments which may reduce D.O. levels at the sediment-water interface and in the vertical water column. Depending on the project, hydraulic dredging and onshore disposal of dredge spoil may require several acres of land. The spoil areas must also be close to the dredging site.

5.03.d. Auxilliary disposal logistic equipment (barges or dump scows) are needed for the bucket dredging method and the size of the project dictate the number of logistic equipment needed. The bucket dredger is capable of operating in shallow or deep water, and hard or soft sediment, but is considerably slower than the hydraulic system.

5.03.e. Deck type or bottom dump type disposal barges are generally used. Dump barges drop spoil through hinge doors in the bottom and the spoil generally drops out in a concentrated mass. This type of spoil disposal requires less time and creates less visible water-surface effects than the deck type barge. The deck type barge is unloaded by using a hydraulic water jet to wash the spoil into the sea, thus creating a large turbidity plume resulting in spreading and spoil over a greater surface area, and may possibly prevent the material from sinking to the desired bottom location.

5.03.f. As a result of the environmental analyses conducted and summarized in this report, the proposed facility will be dredged by an 18-to-20 yard bucket into the largest commercially available scow with a bottom drop.

5.04. Alternative Disposal Areas and Methods. Several alternative methods and disposal areas were reviewed in the course of preparation of the Draft and Revised Draft Environmental Impact Statements. These methods consisted of : total land disposal, part sea - part land disposal, dredge spoil farming, incineration, container disposal, island construction and ocean disposal.

5.04.a. Total Land Disposal. An analysis of the land use of areas contiguous to the Thames River indicates the absence of large undeveloped parcels that could accept the total amount of spoil to be removed from the river. Five potential land sites were investigated in detail and were found to have a total capacity of 1,700,000 cubic yards indicating that sufficient area for total land disposal is not available.

5.04.b. Part Sea-Part Land Disposal. The five potential land disposal sites are indicated in Figures 36, 37, 38, 39, 40, and 41. Site 1, Hempstead Farms, is located approximately 0.2 miles upstream from the Naval Submarine Base on the west bank of the river. The 65-acre area is privately owned and could accept 813,000 cubic yards of dredge spoil. The Electric Boat Division of General Dynamics has acquired options on this area, for disposal of spoil from dredging operations about to be conducted at their facility. As such, spoil dumpage on this site by the Navy may be precluded should General Dynamics' usage of the site utilize the entire capacity of the area.

5.04.c. Site 2, Goss Cove, is located on the east bank of the river opposite the main gate to the Submarine Base. The 2± acre parcel is in both Government and private ownership. The cost of mobilization for this two acre site with a capacity of 17,000 CY is considered excessive, and the ponding area would not be large enough to allow sufficient settling time for solids to deposit from the liquid dredge spoil before discharge of water back into the river. The site is also severely restricted by the Penn-Central Railroad right-of-way. An analysis of the railroad embankment stability would have to be made in order to check the ability of the embankment to sustain the additional lateral loading caused by the disposal of the dredged material. Also construction easements would need to be obtained from the railroad company for intake and discharge pipes.

5.04.d. Site 3, the U.S. Coast Guard Academy, is located approximately 0.8 miles downstream from the Naval Submarine Base on the west bank. This 40-acre site would be adequate for disposal of 750,000 cubic yards of dredge spoil.

5.04.e. Site 5, Columbia Cove, is located at the Naval Underwater Systems Center - New London Laboratory. This four-acre site would have capacity for the disposal of 82,000 cubic yards of dredge spoil. The ponding area, however, would be too small to allow settlement of the suspended solids from liquid dredge spoil before discharge back into the river.

5.04.f. Site 5, Fort Trumbull, is a 1.5 acre site inadequate in size to allow settlement of suspended solids.

5.04.g. Environmental Effects. Site 1, Hempstead Farms, and Site 3, the United States Coast Guard Academy, are both areas of significant ecological importance. The Department of Interior, Bureau of Sport Fisheries and Wildlife, Boston, Massachusetts, opposes filling of Site 1, as it encompasses a significant waterfowl resting and feeding area. Site 3 has been identified by the Bureau of Sport Fisheries and Wildlife as a significant spawning and nursery area for a variety of fish species. As a result, these two alternatives have been dropped from consideration. The remaining three areas, having a total capacity of 115,000 cubic yards, are inadequate in size to allow proper settlement of the liquid spoil material resulting in turbid plumes being spilled into ecologically sensitive shoal areas. For reasons of environmental impact, inadequate size, and economics, the alternative of part sea-part land disposal has been considered both imprudent and infeasible.

5.04 h. Dredge Spoil Farming. There are several possibilities for using the dredged spoil for rejuvenation of areas which have been denuded of fertile soils. There is a research project in Maryland called "Tidal Marsh Project" which shows considerable promise for the upgrading of coastline area using spoil as a media for planting aquatic plants. To this date, there is insufficient information to justify large-scale use of the spoils in this manner.

5.04. i. Strip mines present another alternative for the use of dredge spoils. Spoils applied to these denuded areas could improve conditions sufficiently to allow revegetation.

5.04. j. The spoil could also be applied as a mulch or fertilizer on crop land.

5.04. k. The drawbacks to these alternatives include great distance and transportation costs in addition to the political jurisdictional problems associated with long distance transportation of the spoils, truck or rail traffic with the resultant increases in noise and air pollution, possible leaching of toxic materials from the spoils and the subsequent contamination of land and water resources.

5.04. l. Incineration. Incineration of dredge spoils to breakdown the organic and toxic materials is another possible alternative. Such an operation could be land or ship based. Lockheed Shipbuilding and Construction Company, Seattle, Washington, has designed a waterborne waste treatment system utilizing old ships hulls. A similar system could be developed utilizing an incinerator which could handle both municipal and industrial waste in addition to neutralizing dredge spoils. Heat and electric power could be a functional byproduct of this kind of operation. The problems associated with this approach include possible air pollution, possible adverse affects of the ash residue in an ocean ecology and the large time factor necessary for the development of a workable system. In addition, the cost would be substantially greater at the outset than other methods.

5.04. m. Container Disposal. The Army Corps of Engineers, New England Division, in an environmental impact statement concerning improvement dredging to Fall River Harbor, considered the possibility of placing all dredged material in a double wall steel sheet pile container. It was proposed that the container be located in the Spar Island area in Mount Hope Bay. On the basis of the quantity of sediment to be dredged, 4 million cubic yards, a container approximately 3,000 feet in diameter and extending 7 feet above mean sea level would be required at a cost of $12-$15 million dollars. The statement pointed out that pollution in the dredged material would be retained, the maintenance material for the next 40 to 50 years from that project could be contained and an island of about 200 acres created

Again, construction cost is the major objection to the alternative. Other problems would involve selection of a suitable site where the structure would not obstruct navigation or be considered aesthetically unpleasing.

5.04.n. Island Construction. The creation of islands from dredge material has both beneficial and adverse effects on the environment. Islands created from spoil could be used as recreational areas or for municipal needs such as airports, power plants, waste treatment plants, or incinerators. Against the development of such islands is the lack of information concerning the impact such construction would have on marine life in the area. An extensive environmental impact study would need to be completed before such a project could go forward. Impediment to navigation and aesthetics in the areas chosen are also negative aspects which must be considered. Not all material from dredging operations is suitable for island construction. Much of the dredged material would be unsuitable and would need to be separated and disposed of elsewhere. A feasibility study is being done by the Corps of Engineers for the City of Baltimore, concerning island development disposal of dredge spoil from the Baltimore Harbor Channel, a situation similar to that in New London. Information useful in future disposal will undoubtedly come from this study and a proposed experimental site in Lower New York Bay also under Corps consideration. Currently, a project of the Norfolk District Office of the Army Corps of Engineers utilizing a 4-square mile disposal island in the Elizabeth River is underway. Reports concerning methods and cleanliness of the project have been favorable. There are two additional drawbacks, however, one being the cost of utilization of disposal islands would be exceedingly high under current practices and second, there would be jurisdictional problems surrounding control of ultimately chosen sites.

5.04.o. Ocean Disposal, Dispersal Sites. In light of the type of material to be excavated from the Thames River, a dispersal form of ocean dumping has been suggested by many authorities in the field. The rich biota of the area as indicated in section 2.17, especially in terms of finfish and lobstering and the lack of knowledge concerning the physiological impacts to these organisms caused by pollutants substances, even at the levels found in the Thames River, precludes dumping in these areas until more detailed long-term impact information is available. Short-term impact is not seen as serious since the majority of finfish in the Race Point area as shown in Figure 31 are pelagic. Also, lobsters and crabs are fairly mobile and able to escape dumping operations and short-term high level turbidity changes. The second dispersal site, 23± nautical miles from the mouth of the Thames River, as shown in Figure 30, has not been carried forward as the disposal site, for much the same reasons as indicated above, and secondly, the possibility of turbidity currents being induced by spoil deposition and the more dense turbid waters being carried into deep Block Channel. The effects of adding pollutants to deep ocean areas has not been researched and current opinion advises against it. The possibility of the movement of the 2.7 million cubic yards of Thames River material from the dispersal site to deep ocean areas has therefore made the choice of a monitored containment site more viable.

5.04.p. <u>Ocean Disposal - Containment Sites</u>. Alternative containment sites have been investigated on the basis of existing and limited generated data. These containment sites are shown in Figure 30. Option Site 3 encompasses the three ocean basins located east of Fisher's Island. Bottom depths range from 200 to 300 feet, and diameters are on the order of one mile. The bottom materials are predominantly sands with less than 10% silt and 2% to 4% clay. The benthic invertebrates most abundant in the vicinity of this site include suspension and detritis feeding amphipods, isopods and foraminifera. Contributing to the faunal diversity of the site are representative species of pelecypod and gastropod mollusks. These shellfish and their larvae, in addition to the small crustaceans and foraminifera, represent major items in the diets of commercial and recreational fish species such as bluefish, flounder, menhaden, scup and striped bass. Small organisms such as amphipods and isopods, lacking great burrowing ability, have the greatest chance of being destroyed by even a shallow burial. Organic silts that comprise the bottom sediments of Thames River would produce anoxic conditions within the pile. While the smaller organisms would be killed off, certain bivalve mollusks are adapted to survive these conditions. Crustacea such as amphipods and isopods that feed on detritis are particularly sensitive to pollutants and other toxic substances in the spoil. Bivalve organisms are also able to move vertically through sediments and so would not suffer great loss from burial. Effects of containment dumping on local fish populations would not be severe since these forms are mobile and can temporarily avoid the site until turbidity settles. Also the bottom material is fairly cohesive. However, if spoils are deposited during spawning periods, this activity could generate major impacts on certain fish. In general, with the exception of Cod (where detailed information is not available) one can assume that the impact of dumping would be less during the winter months. Most species lay eggs which are pelagic and, therefore, are not as susceptible to silt as those whose eggs fall to the bottom, such as Winter Flounder.

5.04.q. From the analyses available, to date, option Site 3 affords the best location for an alternative spoil disposal site. It lacks, however, the more detailed physical, chemical and biological analyses that have been and are being conducted on the selected dump site in Rhode Island Sound.

5.04.r. Alternative containment Site 2 is located in the plains area northwest of Block Island. Approximate depth is 110 feet and the plain is several miles in diameter. The bottom materials consist of silty sands containing more than 25% silt and 5% to 6% clay. The most abundantly represented benthic forms in this area are amphipods. Polychaetes and bivalve mollusks are also abundant, though considerably less so than the amphipods. All of these organisms are major items in the diets of many species of fish, particularly the amphipods. The abundance of these small crustaceans taken in sampling grounds adjacent to this option site makes the area very valuable feeding ground for fish, many of which are commercially important. Included are flounder, menhaden, porgy, and striped bass.

5.04. s. The impacts of spoils dumping on these tiny crustaceans would be the destruction of large populations with a commensurate decline in overall value of this area as a feeding location for fish. The polychaetes and mollusks would be less adversely effected since they have the capability of burrowing upward. The attached sessile species such as oysters, however, are killed by burial. During winter, this species is particularly susceptible to sedimentation. At this time, oyster are relatively inactive and cannot remove silt. Effects on the local fish populations could be quite significant if the material were deposited during spawning. Impacts to populations of adults, however, would not be as great. Recolonization of the spoil by amphipods, polychaetes and bivalve mollusks would occur from the edges of the spoil. Occupation by organisms present in the dumped spoil would be small compared to colonization by populations of organisms native to the dump site vicinity.

5.04. t. Little is known of alternative containment Site 1, other than the fact that deposition is occurring indicating a non-erosive environment. Detailed information on the benthic forms is lacking but a comparison of water chemistry and bottom substrate between this and the subaqueous plain area indicates that the species and impacts discussed in Section 5.04s may be applicable to this site. The lack of detailed information precludes the use of this area as a possible containment site at this time.

6. RELATIONSHIP BETWEEN LOCAL SHORT TERM USES OF THE ENVIRONMENT AND ENHANCEMENT OF LONG TERM PRODUCTIVITY

6.01 The Thames River from the Naval Submarine Base to Long Island Sound has been important to commercial shipping and naval activities since before the turn of the century. The proposed dredging of the river channel will allow the Naval Submarine Base to accommodate the new SSN 688 submarines. This is consistent with past operations at this Base and would certainly be to the Navy's short and long term advantage. The dredging and disposal operations have both long and short term affects on the environment. The short term affects will include increased turbidity, loss of localized populations of benthic organisms at both dredging and dump sites and possible loss of finfish population in the immediate environs of the dredging and spoil sites as a result of increased BOD or the dispersion of toxic chemicals contained in the sediments. The affects at the dredging site are presumed to be short term since past dredging practices have not resulted in permanent loss of finfish or benthic organism populations. New sediment will be deposited at the bottom of the channel reconditioning it for benthic flora and fauna. The long term affects of ocean dumping will depend on the site chosen and the method of deposition used. Even though this information is specified, there is little available information on what the long term ramifications are in terms of vegetation, finfish, shellfish or other benthic organisms, or those higher organisms which live on marine biota. Thus there is no way to reasonably predict the effect of ocean dumping on long term productivity of the area.

DEPUTY UNDER SECRETARY OF THE NAVY
WASHINGTON, D.C. 20350

Exhibit 5

8 AUG 1973

Chairman, Council on Environmental Quality
722 Jackson Place, N. W.
Washington, D. C. 20006

Dear Mr. Chairman:

Since issuance of the Revised Draft Environmental Impact Statement for the Dredging of the Thames River, Naval Submarine Base, New London, Connecticut on May 8, 1973, further evaluation of alternative means of dredge spoil disposal has been made.

Accordingly, please find attached an addendum to the above statement identifying alternate disposal sites considered, along with a report describing an environmental investigation of the New London dumping ground prepared by the Physical Oceanography Division, U.S. Naval Oceanographic Office.

Joseph A. Grimes, Jr.
Deputy Under Secretary of the Navy

Enclosure

Copy to:
ASD (I&L)
ASD (H&E)
CINCLANTFLT
COMSUBLANT
NAVFACENGCOMHQ
NORTHNAVFACENGCOM
NAVSUBASE New London, CT
OCEANAV
COMONE
Environmental Protection Agency
Regional Administrator, Environmental Protection Agency, Region I
Regional Administrator, Environmental Protection Agency, Region II
Assistant Secretary of Programs, Office of Environmental Project Reviews, U. S. Department of Interior
Deputy Assistant Secretary for Environmental Affairs, U. S. Department of Commerce

Copy to: (Cont'd)
Director, Office of Program Coordination, U. S. Department of Transportation
Commandant, U. S. Coast Guard
Executive Director of Civil Works, Office of the Chief of Engineers, Department of Army, Corps of Engineers
Director, U. S. Water Resources Council
Director, National Oceanic & Atmospheric Administration, U. S. Department of Commerce
Office of State Planning, Department of Finance and Control
Southeastern Connecticut Regional Planning Agency
Office of State Planning and Management
Rhode Island Statewide Planning Programs, Department of Administration
New York State Office of Planning Services
Tri-State Regional Planning Commission
Southeastern Massachusetts Regional Planning & Economic Development District
Sierra Club, Connecticut Chapter
Fishers Island Civic Association, Inc.
Point Judith Fishermans Association
University of Rhode Island

ADDENDUM
REVISED DRAFT ENVIRONMENTAL IMPACT STATEMENT
DREDGE RIVER CHANNEL
NAVAL SUBMARINE BASE
NEW LONDON, CONN.

JULY 1973

INTRODUCTION

This Addendum to the Revised Draft Environmental Impact Statement (RDEIS) covering the Dredging of the Thames River, Naval Submarine Base, New London, Connecticut (issued to the Council on Environmental Quality on 8 May 1973) details the further investigation and evaluation of alternative means of Dredge Spoil Disposal that have ensued since the RDEIS was filed. These investigations have been undertaken in order to comply with the provisions of the Marine Protection, Research, and Sanctuaries Act of 1972 (P.L. 92-532) and the Ocean Dumping Criteria issued by the Environmental Protection Agency on 16 May 1973 (38 F.R. 12872).

ALTERNAVITE DREDGE SPOIL DISPOSAL SITES CONSIDERED

The 8 May 1973 RDEIS stated that:

"Utilization of the University of Rhode Island offshore dump site study area will be continued until an alternative site in Block Island Sound is found to be more environmentally suitable.... Should a change in dump site be indicated, a revised permit will be submitted to comply with existing regulations. In any event, the Navy will direct its spoil dumping activities to that area found to be the least environmentally disruptive." (RDEIS para. 1.11, pg. 9)

Since the issuance of the EPA Ocean Dumping Criteria, the Navy and the Army Corps of Engineers have coordinated with various Federal agencies and the State of Connecticut to investigate and evaluate alternative Dredge Spoil Disposal Locations. These investigations were augmented by the recently completed Navy report (prepared by the Naval Oceanographic Research Laboratory) which detailed the results of the monitoring of Dredge Spoil deposited in the New London Dumping Ground.

In order to more fully explore the various disposal alternatives, the Scientific Advisory Committee of an Interagency Coordinating Committee on Dredging and Ocean Disposal

8 1900

was asked for a recommendation as to an acceptable Dredge Spoil Disposal Plan. This Committee has representatives from EPA, National Oceanic and Atmospheric Administration, the U.S. Fish and Wildlife Service, and the Army Corps of Engineers. In addition, the Connecticut Department of Environmental Protection, the University of Connecticut, and U.S. Navy scientists were consulted regarding details of the Plan. The committee made the following recommendations:

a. That the New London Dumping Ground, described below, should be the primary disposal site. Disposal would commence there under a study program to assess whether any adverse environmental effects occur. If significant adverse effects occur, the disposal operations would be moved to an alternative site or ceased, depending on data gathered in a concurrent study of alternative disposal sites.

b. That the concurrent study would investigate alternatives that include a site 10 miles southeast of Block Island and a reconnaisance study of Block Island Sound to determine if any site in that body of water would be appropriate for sea disposal.

The New London Dumping Ground is described as follows: An area one nautical mile square, the sides of which run true north and south and true east and west. The center at a point with New London Harbor Light bearing true 348° (N magnetic) distant 5,800 yards; and New London Ledge Light bearing true 359° (N by E magnetic) distant 4,425 yards. The water depth varies from 63 to 72 feet at mean low water.

CONCLUSION

The Navy concurs with the Committee recommendations and will undertake the Dredge Spoil Disposal Plan detailed in the preceeding section.

Enclosure:
Preliminary Report - Environmental Investigation of a Dredge Spoil Disposal Site Near New London, Connecticut, prepared by the Physical Oceanography Division, Naval Oceanographic Office

8 1900

Exhibit 6A

DEPARTMENT OF THE NAVY

FINAL

ENVIRONMENTAL IMPACT STATEMENT

VOLUME 1

[Excerpts]

NAVAL SUBMARINE BASE, NEW LONDON,

GROTON, CONNECTICUT

DREDGE RIVER CHANNEL

DECEMBER, 1973

1. PROPOSED ACTION

1.01. Nature of the Proposal. This statement details the project of the United States Navy in New London and Groton, Connecticut and nearshore areas under the jurisdiction of the State of Connecticut. It is proposed to dredge certain portions of the Thames River and spoil the material in the New London Dumping Ground, as detailed in Sections 1.02 through 1.18 below. In compliance with the intent of the National Environmental Policy Act of 1969, and various Department of Defense directives, this project can be considered an action requiring the preparation of an Environmental Impact Statement. Among factors considered by the Navy in the preparation of Environmental Statements are conservation, economics, aesthetics, historic values, fish and wildlife resources, flood damage prevention, navigation, recreation, water supply and water quality, and, in general, the needs and welfare of the people. This Statement addresses those considerations above mentioned.

1.02. Project Description. The project, for purposes of clarity and ease of environmental assessment can be broken down into three categories: (1) channel widening and deepening; (2) widening and deepening the approaches to the State Pier and the Naval Underwater Systems Center; (3) spoil disposal.

1.03. Widening and Deepening the Channel, as shown in Figures 1 and 2a, b and c, consists of dredging the Thames River Channel to a depth of 36 feet plus a 1 foot overdredge allowance from the U.S. Naval Submarine Base, New London, Groton, Connecticut, to the mouth of the River in Long Island Sound, a distance of approximately 7.5 miles. The channel was last dredged to a depth of 33 feet in 1965 above Gold Star Bridge. The present controlling depths in New London Harbor are 32 feet in the authorized 33 foot entrance channel and 33 feet from just above the railroad bridge to the submarine base.

1.04. Dredging is proposed to commence in late 1973 and will require two years to complete. The entire dredging project will be accomplished in two increments. In the first increment the channel will be widened and deepened to 36 feet plus a 1 foot overdredge allowance from Station 184+04 (near the State Pier) to Station 396+04 (mouth of channel), a distance of 21,000 feet. The second increment of channel dredging will widen and deepen the channel from Station 0+00 (Submarine Base) to Station 140+45 (near Gold Star Memorial Bridge) a distance of 14,045 feet. Maximum dredge depth for both increments is 36 feet plus a 1 foot overdredge allowance. Width varies from 300 feet to new 600 foot (average) from the submarine base to the railroad bridge and 500 feet from the bridge to Long Island Sound. The amount of material to be removed from widening and deepening the channel is approximately 2.4 to 2.5 million cubic yards.

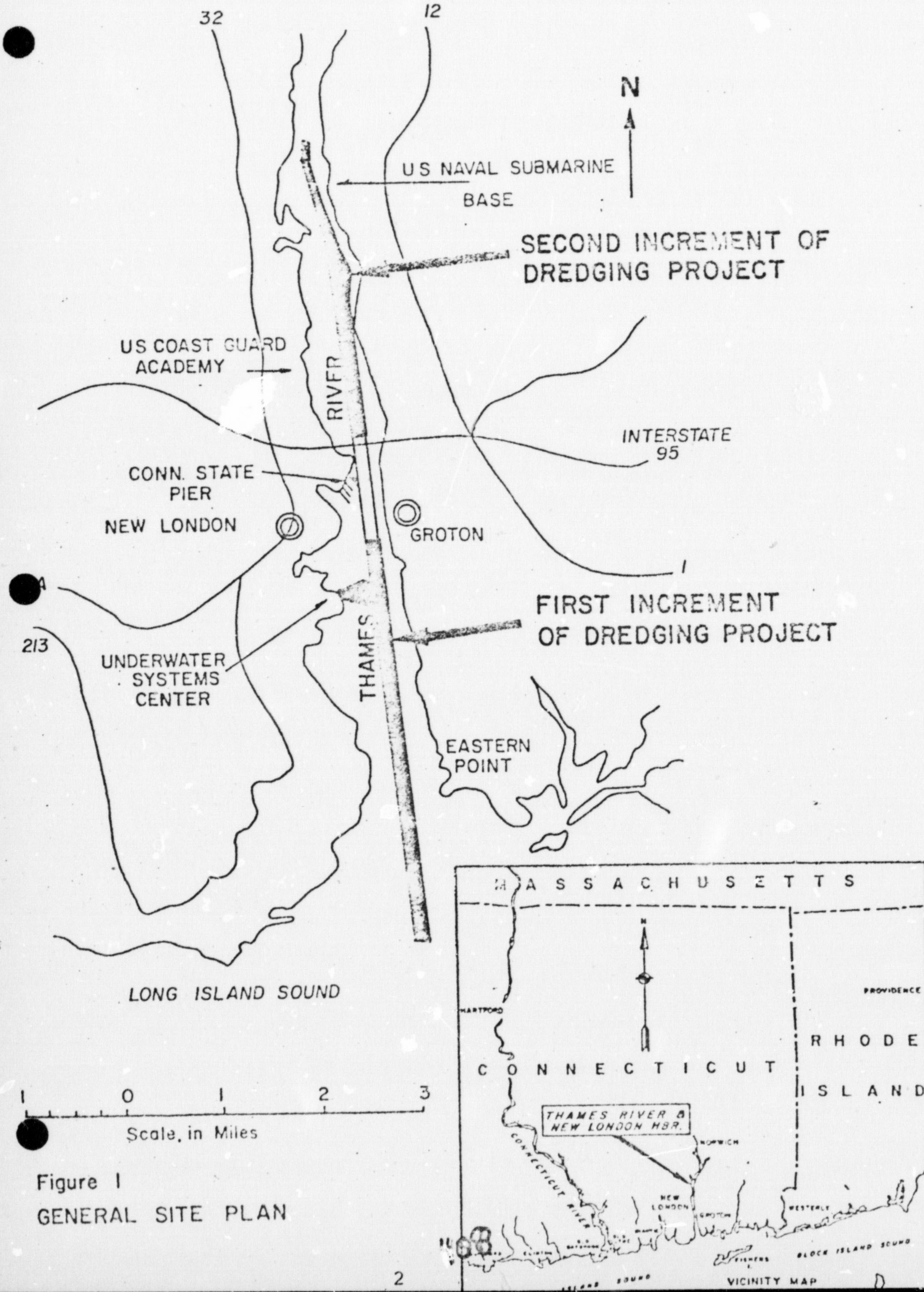


Figure 1

GENERAL SITE PLAN

1.05. Widening and deepening the approaches to the State Pier and Underwater Systems Center is proposed for the first increment of work in late 1973. The areas proposed to be dredged to 38 feet plus a 1 foot overdredge allowance in depth are shown in Figure 2b. Existing depth in the Underwater Systems Center area averages 32 feet. Width varies from 280 feet at the shore end of the pier to 1300 feet wide at the River Channel line. Existing depth at the approach to the State Pier averages 35 feet. Width varies decreasing from 800 feet at the inboard end of the pier to zero at the River Channel approximately 1800 feet in length. The amount of material to be removed from widening and deepening the approaches to the State Pier and Underwater Systems Center is approximately .4 million cubic yards.

1.06. An approximate total of 2.8 to 2.9 cubic yards of bottom deposits will be removed in this project. Improved pier facilities will be required to make optimum utilization of the channel improvements proposed by this project. Improvement projects, as presently planned, will require the removal of approximately 300,000 CY of bottom material from areas near the existing Naval Submarine Base piers.

1.07. The dredging will be conducted by using a large volume, i.e. 10 to 18 cubic yard bucket and a high volume scow with mechanisms to drop the load so as to maximize cohesion of the dumped mass and minimize turbidity increases and indirect changes in water quality. Environmental studies conducted on the excavate materials (Sections 2.06a, 2.06b, 2.06c) have shown the materials to best be handled in this manner to minimize environmental effects. Time of operations shall be approximately two years, as the data on ongoing excavation within the Thames indicates no significant change in water quality that could adversely effect the migration of anadromous or catadromous species. None the less, should actual field operating conditions prove other than those anticipated such that fisheries are being adversely affected, the operations schedule will be modified to insure against unacceptable environmental damage.

1.08. Spoil Disposal. Upon a thorough investigation of alternatives to the proposed project and alternative disposal methods, dumping of the spoils in ocean areas has been determined to be the most feasible and least environmentally disruptive method to accomplish the proposed action. Of the alternative ocean dumping sites, areas of relative containment seem to be the most prudent in light of the state of knowledge of the impacts to the marine ecosystem. Of the several relative containment sites, the most environmentally suited for the material to be disposed of is the previously spoiled dump site in Long Island Sound shown on Figure 3. The dump site has been used historically for disposal of an annual average of about 300,000 cubic yards of material for approximately the last 20 years. The proposed project will utilize this dump site for disposal of material to be excavated from the Thames River, New London Harbor area.

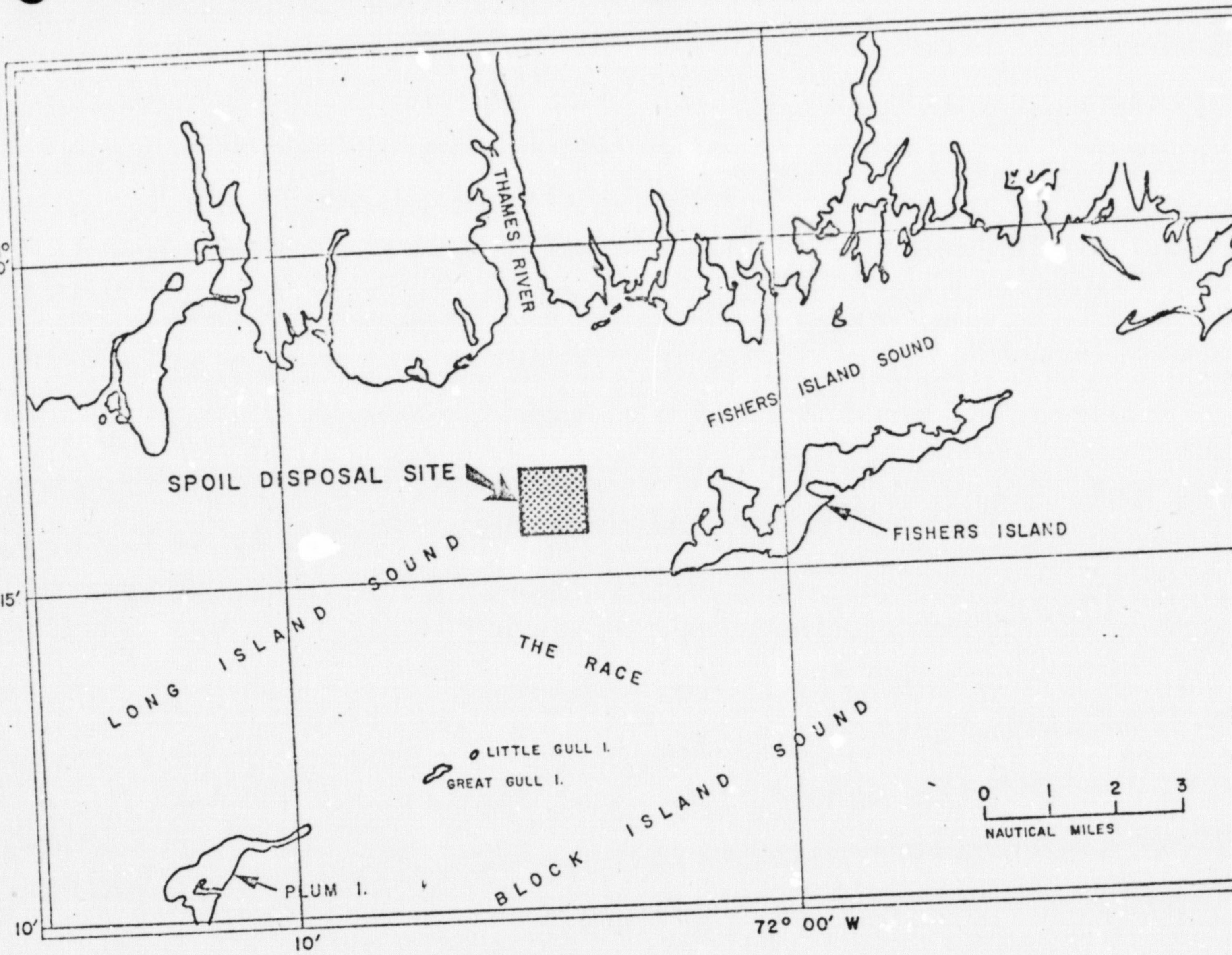


FIGURE 3 DREDGE SPOIL DISPOSAL SITE

1.09. The choice of the proposed dump site was an outgrowth of the integration of the many comments received on the draft copy of this statement, further investigation into the physical, chemical, and biological properties of Block Island Sound and Eastern Long Island Sound, and the necessities of National Defense which require a capability for operating SSN 688 class submarines out of the New London area. More specifically, the United States Department of the Interior had the following comments:

> "We feel that a project of this magnitude with the capability of significant environmental degradation must be conducted only in conjunction with a study to determine the biological effects of the project. Major categories which should be included in such a study are the change in species composition and numbers within the dump area and investigations of the environmental changes in adjacent areas. To this end, biological inventories should be conducted before, during, and after dumping activities to assess the biological populations within and adjacent to the spoil site. Long-range monitoring of the chemical, physical and biological characteristics of the dump site and adjacent areas should be made to determine the stability of polluted materials in the dump zone."

In the Revised Draft Environmental Impact Statement the Environmental Protection Agency was recorded as being opposed to the use of the Long Island Sound site. That Agency stated,

> "We recommend that the material be disposed outside of the Long Island Sound, as recommended by the Long Island Sound Enforcement Conference of 1971."

The passage of PL 92-532 subsequent to that statement has altered the EPA position. The EPA notes that "Section 103(d) of the Ocean Dumping Statute allows for more flexibility in evaluating the economic possibilities available. If no other alternatives are available, then a waiver may be given to exceed the previously published numerical criteria."

1.10 The 8 May 1973 RDEIS stated that:

> "Utilization of the University of Rhode Island offshore dump site study area will be continued until an alternative site in Block Island Sound is found to be more environmentally suitable.... Should a change in dump site be indicated, a revised permit will be submitted to comply with existing regulations. In any event, the Navy will direct its spoil dumping activities to that area found to be the least environmentally disruptive." (RDEIS para. 1.11, pg. 9)

Since the issuance of the EPA Ocean Dumping Criteria, the Navy and the Army Corps of Engineers have coordinated with various Federal agencies and the State of Connecticut to investigate and evaluate alternative dredge spoil disposal locations. These investigations were augmented by the recently completed Navy report (prepared by the Naval Oceanographic Office) which detailed the results of the monitoring of Dredge Spoil deposited in the New London Dumping Ground. This report is contained in Volume 2 as Exhibit J.

1.11 In order to more fully explore the various disposal alternatives, the Scientific Advisory Subcommittee of an Interagency Coordinating Committee on Dredging and Ocean Disposal was asked for a recommendation as to an acceptable dredge spoil disposal plan. This Subcommittee has representatives from EPA, National Oceanic and Atmospheric Administration, the U. S. Fish and Wildlife Service, and the Army Corps of Engineers. In addition, the Connecticut Department of Environmental Protection, the University of Connecticut, and U. S. Navy scientists were consulted regarding details of the Plan. The Subcommittee made the following recommendations:

a. That the New London Dumping Ground, described below, should be the primary disposal site. Disposal would commence there under a study program to assess whether any adverse environmental effects occur. If significant adverse effects occur, the disposal operations would be moved to an alternative site or ceased, depending on data gathered in a concurrent study of alternative disposal sites.

b. That the concurrent study would investigate alternatives that include a site 10 miles southeast of Block Island and a reconnaisance study of Block Island Sound to determine if any site in that body of water would be appropriate for sea disposal.

1.12 As a result of the recommendations of the Scientific Advisory Subcommittee, the Navy has been directed by the Army Corps of Engineers to utilize the New London Dumping Ground.

1.13 This directive has been issued under authority of Section 404 of the Federal Water Pollution Control Act amendment of 1972. Section 404 of that Act provides that the Secretary of the Army shal[l] specify the disposal site through application of the guidelines established by the Environmental Protection Agency. The Corps, reaching their decision to require the Navy to utilize the New Lond[on] Dumping Ground, has reviewed the Navy's data, findings of Scientifi[c] Advisory Subcommittee, and their own information regarding the proposed disposal site.

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1.14 The Navy, therefore, will utilize the Connecticut portion of the New London Dumping Ground, an area one nautical mile square, the sides of which run true north and south and true east and west. The center at a point with New London Harbor Light bearing true 348° (N magnetic) distant 5,800 yards; and New London Ledge Light bearing true 359° (N by E magnetic) distant 4,425 yards. The water depth varies from 63 to 72 feet at mean low water.

1.15 Environmental Testing. An extensive study program in relation to the disposal of the Thames River material will be undertaken. The program was carefully designed by the Navy in conjunction with a committee of highly qualified scientists from the United States Environmental Protection Agency, U.S. Fish and Wildlife Service, the National Oceanic and Atmospheric Administration, and the Corps of Engineers. It was also coordinated with the Connecticut Department of Environmental Protection, University of Connecticut, Yale University and several other organizations. The program is designed to assess the environmental impact of dredge disposal on the New London Dumping Ground and provide data to the scientific subcommittee for use in advising the Corps of Engineers. The effects of dredging on the hydrology and living resources of the Thames River will be examined and the immediate effects and rate of recovery will be determined for the water mass, sediment and benthic biota in the disposal area. Design of the program is such as to compliment other research programs conducted and planned for the area.

1.16 The testing program will be implemented in three segments: (1) pre, (2) concurrent and (3) post-dredge surveys. Pre-dredge survey efforts are designed to describe conditions existing at both the dredge and disposal sites prior to commencement of operations. Environmental surveys conducted concurrent with the dredging and disposal operations will provide data to characterize the short-term effects of the operation. Post dredging surveys will determine the degree of transport of materials from the disposal site and describe the recovery of the area. The post disposal surveys will be conducted approximately six months to one year after completion of disposal operations.

1.17 An alternate dump site, a one mile square area, located approximately ten miles southeast of Block Island and centered at 41° 02' 03" N and 71° 29' 48" W will be studied prior to any use to determine its suitability as a spoil disposal site in the event that disposal operations are terminated at the proposed disposal site. Surveys shall include bathymetry, biology, sediment, dynamics, and water quality.

1.18 In compliance with the National Environmental Policy Act, the States of Connecticut and New York and appropriate agencies within the State have been advised of the proposed action by the Navy and by the Corps of Engineers following the procedures for a permit request.

1.19 Project Costs. Project costs have been estimated at approximately $9,500,000 to accomplish the work described in preceding sections utilizing the New London Dumping Ground. Using the Brenton Reef Dumping Ground off Newport, Rhode Island, which was originally proposed by the Navy, would cost about $17 million.

1.20 Project Purpose. The Naval Submarine Base, New London and Groton, Connecticut, was first established as a Navy Yard in 1867 and the first submarine was homeported there in 1915. Subsequently, the base has been expanded to serve the nuclear powered submarine fleet as well as diesel submarines. In the interest of National Defense, the Secretary of the Navy has determined the facilities at New London, Connecticut, to be essential in maintaining the National security and intends to assign a classified number of the new and larger SSN 688 class of nuclear powered submarines to be homeported at the base and others to be berthed and outfitted at the Underwater Systems Center. Also, only through actual performance in the operational waters of the Atlantic Ocean by the Submarine Development Group can the full tactical capability inherent in this new design be achieved. Operational development of maximum capability for the new SSN 688 submarines by the only submarine development group on the East Coast will be precluded because of insufficient depth and width of the New London Channel. The highest priority to maintaining tactical ability in the area is to be able to outfit and service submarines of this size at the State Pier and Underwater Systems Center. Hence, the immediate need to begin the proposed project in the lower channel and the above mentioned pier approaches.

1.21 The SSN 688 class nuclear submarines have a draft of 32 feet which requires deepening areas in which they will be navigating to 36 feet plus 1 foot overdredge. Also deep draft nuclear submarines are placed in unacceptably hazardous maneuvering circumstances while navigating the channel from the railroad bridge to the base. This 1.1 mile long section of the Thames River channel is only 300 feet wide and contains two changes of direction while the remainder is 500 or more feet wide. Nuclear submarines have severely limited maneuverability at the low speeds required for river navigation. The presence of a railroad drawbridge requires a significant number of submarines to make a complete stop. This greatly increases their difficulty in maintaining position within the channel. The possibility of becoming lodged crosswise in the channel requires that the channel be widened to allow for turning space. The narrowness of channel not only makes navigation hazardous, but also prevents other Navy and commercial vessels from passing or overtaking with adequate safety. For safe passage of an increasing number of deep draft nuclear submarines, it will be necessary to straighten, widen and for the SSN 688 class submarine, deepen the river channel by dredging.

TABLE 2

RESULTS OF LABORATORY ANALYSIS OF CHEMICAL POLLUTANTS

EPA CRITERIA	6.0	5.0	0.10	0.15	.0001	.005	.005
Number	Vol Sol	COD	N	OIL	Hg	Pb	Zn
KE-1	2.06	2.54	0.05	0.04	.000008	.00204	.00599
KE-5	2.01	2.39	0.05	0.045	.000009	.00181	.00510
KE-6	2.58	3.25	0.08	0.044	.000012	.00336	.00691
KE-7	2.20	2.83	0.06	0.042	.000007	.00200	.0051
KE-8	2.83	3.49	0.07	0.109	.000018	.00294	.00619
KE-9	2.22	3.39	0.06	0.091	.000015	.00284	.00592
KE-10	3.32	4.99	0.09	0.112	.000017	.00437	.00711
KE-11	2.29	3.60	0.05	0.046	.000004	.00129	.00406
KE-12	3.11	5.17	0.09	0.100	.000016	.00309	.00737
KE-13	2.68	3.91	0.08	0.058	.000005	.00238	.00517
BH-1	4.32	3.04	0.12	0.09	.000002	.00410	.0035
KE-14	4.74	6.97	0.14	0.020	.000020	.00525	.00904
BH-2	6.07	4.80	0.10	0.13	.000002	.00360	.0034
BH-3	6.24	5.07	0.13	0.10	.000002	.00350	.0033
BH-4	5.26	3.96	0.16	0.08	.000002	.00270	.0019
BH-6	7.18	5.86	0.21	0.12	.000004	.00460	.0024
KE-3	4.24	6.41	0.14	0.097	.000021	.00491	.00835
KE-2	3.93	5.43	0.02	0.106	.000007	.00182	.00545
BH-7	8.55	6.95	0.19	0.17	.000002	.00360	.0020
KE-4	2.72	4.43	0.07	0.116	.000023	.00575	.00969
BH-8	8.13	6.82	0.087	0.11	.000016	.00730	.0055
BH-9	7.25	5.96	0.19	0.15	.000020	.00540	.0024
BH-10	8.32	6.04	0.24	0.13	.000002	.00500	.0039
BH-12	6.61	5.23	0.16	0.11	.000003	.00350	.0023
BH-17	6.63	4.94	0.15	0.09	.000002	.00410	.0020
BH-19	7.09	5.66	0.20	0.13	.000014	.00490	.0019
BH-21	7.59	6.09	0.094	0.12	.000002	.00160	.0016
BH-23	6.63	5.50	0.16	0.10	.000002	.00130	.0027
BH-26	11.60	9.93	0.20	0.14	.000016	.00710	.0055
BH-34	10.91	9.58	0.22	0.11	.000002	.00770	.0051
BH-29	10.76	9.05	0.20	0.12	.000002	.00860	.0056
BH-35	11.13	9.87	0.30	0.13	.000002	.00810	.0056
BH-31	9.74	8.12	0.27	0.16	.000002	.00750	.0055
BH-32	9.16	7.90	0.22	0.10	.000002	.00640	.0054
m =	5.89	5.56	.140	.100	.0000087	.0042	.0048
σ =	3.00	2.09	.068	.036	.0000073	.0021	.0021
M_k =	2.95	4.20	.082				
σ_k =	.892	1.42	.031				
M_b =	7.95	6.51	.180				
σ_b =	2.04	1.98	.057				

2.06.h. Analysis of the elutriate was conducted in August of 1973 to determine the acceptibility of the spoil material for ocean disposal under the Final Regulations and Criteria of 15 October 1973. These analyses, while preliminary, involved chemical analysis of the supernatant resulting from a vigorous 30 minute shaking of one part sediment with four parts of water from the proposed spoil disposal site and then letting the mixture settle for one hour. The preliminary results of these tests indicate that the criteria was exceeded in several cases; particularly for the upstream segments of the second increment of this project. The detailed results of the analysis are included in Volume 2 as Exhibit L.

2.07. Thames River Estuary, Bottom Pathogens. Bacteriological studies of a pilot nature were conducted on sediments to be dredged within the Thames River Estuary to assess the public health hazard associated with the various pathogens tested for. Cores taken at each of the four sample station locations, located in Figure 16, were each tested for total coliform, fecal coliform, fecal streptococci, Salmonella, and staphylococci. The results of the investigations are presented in Table 6.

TABLE 6

RESULTS OF ANALYSIS OF PATHOGENS IN BOTTOM SEDIMENTS, NEW LONDON HARBOR AND THAMES RIVER

STATION	FECAL COLIFORM	TOTAL COLIFORM	FECAL STREPTOCOCCI	SALMONELLA	STAPHYLOCOCCI
1	200*	300	12,600	0	700
2	300	0	100	0	5100
3	7300	2900	0	0	2500
4	6800	8000	200	0	6700

*Results expressed in numbers per 100 grams of sediment,

2.07.a. The coliform Bacilli are found in the intestinal tract of man and other forms of higher animals and are universally used as an indicator of domestic pollution and the presence of pathogenic organisms.

2.07.b. Sample Stations SS 1 through SS 4 indicate that an increasing number of these organisms is present in the sediments.

2.07.c. Fecal Coliform is also used by public health authorities as an indicator of pathogenic organisms. However, the Fecal Coliform test is specific to organisms that have originated in the intestinal tracts of warm blooded animals. Here again, the numbers of organisms in the sediment increase from North to South and the levels indicate domestic sewerage discharge in the area.

2.07.d. Staphylococci are pathogenic micro-organisms that are the commonest cause of localized suppurative infections. Staph are relatively more resistant to heat and disinfectants than are other pathogenic bacteria and are constantly present on the skin and in the upper respiratory tract.

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2.09t. Although light is probably the most important single factor influencing the distribution of diatoms, nutrients levels are also important. Definite cycles are present with large scale population increases occuring at predictable times. Diatom "blooms" are common during the spring and fall at which time cell numbers have been known to exceed 1,000,000 cells per liter of sea water. The "blooms" are initially triggered by the mixing of nutrients from the bottom sediments into the water column. Such nutrients are "food" for the diatoms. In addition to sunlight and nutrient levels, diatom populations are influenced by several other factors including dissolved oxygen, pH, turbidity and temperature.

2.09u. In addition to their role as primary producers, diatoms are important members of the food chain of marine organisms. They represent the first level in the food chain and are fed upon by small zooplankton such as amphipods. They are also a major food source for such fish as smelt and mummichogs. Following diatoms "blooms", zooplankton populations increase sharply as the result of increased food supply. Eventually their numbers become so great that they deplete their diatom food supply. Many then starve to death,and numbers once again decrease.

2.09v. The low diatom population found in the Thames River was probably due to the time of collecting. Nutrient levels were not excessively high as thorough mixing had not released nutrients from the bottom sediments. Thus a dense population was not possible. Low temperatures along with winds and wave action in the fall will result in a mixing and release of bottom nutrients and subsequent diatom "bloom".

2.10 <u>Block Island Sound and Eastern Long Island Sound.</u> Block Island Sound lies on the southern coast of New England between Rhode Island Sound and Cape Cod on the east and Long Island on the west. Block Island Sound is a deep, navigable body of water which forms the eastern approach to Long Island Sound, through a passage known as the Race. The Sound opens on the east into Rhode Island Sound and on the south into the Atlantic Ocean. The axis of Block Island Sound extends in a northeasterly-southwesterly direction, with a maximum length of approximately 32 nautical miles from Point Judith, Rhode Island,to Gardiner's Island, New York and maximum width of approximately 13 nautical miles from Watch Hill, Rhode Island to Montauk Point, Long Island.

2.10a. The western and eastern boundaries of the Sound are made up of islands, the largest being Block Island on the east. Block Island is located eight miles southwest of Point Judith and is five miles long and from one to three miles wide. A chain of islands, stretching between Watch Hill, Rhode Island and Orient Point, Long Island, make up the western boundary of the Sound. The southern coast of Rhode Island from Watch Hill to Point Judith forms the northern boundary (104).

2.10b. Long Island Sound is generally defined as being that body of water bounded by the northern coast of Long Island on the south and the Connecticut shoreline on the north. The eastern end of the Sound can be visualized as a line connecting Watch Hill Point in Rhode Island to Orient Point on Long Island. The western entrance is considered to be through the section connecting Throgs Neck with Willitts Point (112).

2.11. Inventory of Surface Waters, Quantitative Aspects. Spoil disposal is proposed for the New London Dumping Ground. The current patterns are covered for the entire of Long Island Sound both for the sake of completeness and because of the influence that Long Island Sound has on currents in neighboring Block Island Sound.

2.11a. Long Island Sound may be best characterized as an oscillating tidal basin (112). That is to say that tidal variations tend to manifest themselves as essentially standing waves whose wavelength is four times the length of the Sound. The physical manifestations of this are that the Race (at the mouth of the Sound) exhibits a low tidal range and high velocities (up to five knots), while Throgs Neck has a large range but relatively low velocities.

2.11b. In addition to the very large current velocities at the mouth of the Sound, there are two other interesting points concerning tidal circulation in Long Island Sound. First, both the work of Swanson (112) and earlier of Riley (89) indicate that near the center of Long Island the current is rotary in nature, with a definite circular pattern to the surface flows averaged over many tidal cycles. Second, Hollman and Sandberg (50) indicate that there is a bottom to top rotary motion, as well. This is expressed by the fact that bottom drifters released in Long Island moved northwesterly, while surface drifters moved in a generally easterly direction. Figure 21, taken from Hollman and Sandberg, illustrates this clearly.

2.11c. Based on the Navy's investigation of the proposed New London Dumping Grounds (Volume 2, Exhibit J) net transport was found to be into the Sound. But this residual flow is weak, and dominated by reversing tidal currents which would tend to retain any suspended matter in the general vicinity of the proposed disposed site. Therefore the New London Dumping Ground area could be considered a relative containment site as long as one realizes that there are no areas in coastal waters, at least, where total containment would occur.

2.11d. Currents Within Block Island Sound. The current patterns in Block Island Sound have been extensively surveyed (68,50,89,104,31,65). These many surveys deal with two major aspects of flows within Block Island Sound; the instantaneous flow, which is essentially the velocity and direction of flow at a given location and depth, and the net flow, which is the

time averaged flow of water through the Sound. The instantaneous flow patterns are due to the tidal currents and are well known as far as surface velocities are concerned. The net flow, or residual drift, has been studied by Hollman and Sandberg (50) and sheds light on the long term movements of water within the Sound.

2.11e. Tidal Currents. The tidal currents which sweep through Block Island Sound are among the swiftest on the East Coast. In the constricted area known as the Race, the U.S. Coast and Geodetic Survey Tidal Current chart for Long Island and Block Island Sounds (Fig. 22) shows a maximum ebb velocity of 5.2 knots and a maximum flood velocity of 4.0 knots. In the constriction between Fisher's Island and Napatree Point, the velocity reaches 2.5 knots and where the currents sweep out around Montauk Point and Block Island the velocity again reaches 2.5 knots. The currents in the central and west central parts of the Sound average about 1.5 knots. The ebb currents diverge around Block Island leaving the area west of the Island with surface currents of less than one knot. The flood currents flow around Block Island and this same area, which is now in the lee of the island, once again has currents of less than one knot (104). These tidal currents were measured at the surface, but Nalwalk et al (68) indicate that currents of comparable magnitude may be expected at the bottom of Block Island Sound. Their results showed that, for three locations in Block Island Sound, the bottom currents were often at different directions than the top currents, but that the speeds were very nearly equal. Their data indicates that bottom current velocities may be safely assessed by assuming that they are equal to the surface velocities. It should be noted, however, that it would not be correct to assume that bottom current directions may be assessed from surface data. The bottom currents of Block Island Sound have not been sufficiently mapped to allow accurate predictions of direction.

2.11f. Non-Tidal Circulation. The large magnitude of the tidal velocities and their cyclic nature tend to obscure the non-tidal circulations in any estuary. This is the case in Block Island Sound, but these circulations, fortunately, can be measured. A simple and direct method of measuring time averaged circulation, or residual drift, is the use of surface and bottom drifters with return cards attached

5. Most non-toxic spoils and also those with high organic content subject to decomposition should be dispersed.

6. Four basic criteria deemed important in determining the degree of dispersal or containment of a prospective ocean dump area are:

   1) Physiography and sea floor sediments

   2) Current (surface and bottom) regime

   3) Nature of the spoil material (grain size, cohesiveness, water content)

   4) Biotic Productivity

3.14. As a result of these guidelines, existing data was gathered and presented in Section 2 of this statement in such a format as to be able to logically and systematically locate possible dump sites for the 2.8 to 2.9 million cubic yards to be removed during the dredging operation.

3.15. In response to item 3 on the proceeding page, in terms of classifying the materials as to whether they need to be contained or dispersed, the results of the physical, chemical and biological analyses indicate the material to be organically enriched with the mean concentrations of heavy metals not exceeding the EPA guidelines. A dispersal type of dumping is indicated at first glance. The areas into which dispersal dumping is possible, however, are all extremely productive in terms of shell and finfish fisheries. The indirect effects of dispersal dumping from a biological standpoint are unknown and unquantified as yet, especially in terms of heavy metal concentrations in the water column. The indirect effects of changes in water and sediment quality on benthic forms is also as yet unquantified. Little is known of the food chain - heavy metal relationship. Thus, even though the heavy metal concentration in the spoil materials does not exceed the EPA criteria, and the high organic content would best be degraded by dispersal, the most prudent classification of the materials is one better suited for containment.

3.16. As a result of the analysis conducted and summarized in Section 2, possible ocean dump site area were selected from a preliminary look at the pertinent environmental factors. Two sites were considered for dispersal dumping, the Race and the head of Block Channel. Five sites were considered for containment, the subaqueous plains northwest of Block Island, the mouth of Napeague Bay, the deep ocean basins southeast of Fisher's Island, and the spoiled dumpsite currently being used and monitored in Rhode Island Sound, and Long Island Sound, the New London Dumping Ground. The dumpsites are shown on Figures 3 and 3a.

3.17. The impacts of the proposed dumping on alternative ocean dump sites is covered in Section 5. The remainder of this section deals with generalized impacts on marine life from

spoil disposal, and the probable environmental impact of using the New London Dumping Ground as the location for disposal of spoil originating in the Thames River. ?

3.18. In recent years the practice of disposing of dredging spoils by dumping in offshore coastal waters has generated considerable concern over the possible short and long-term impacts to the marine environment. Studies carried out by university staff, government personnel, and private research teams in the Northeast have provided information relating to the responses of marine organisms to spoils dumping. The following sections are taken for the most part verbatim from the excellent work of the University of Rhode Island, University of Connecticut and Connecticut College. Specifically, the impacts of spoils dredged from Providence River and dumped in Rhode Island Sound between 1967 and 1970 were investigated by URI Marine Lab during which effects on benthic forms, shellfish, and finfish were considered. This research and information available from other current studies and in the literature has provided much of the background information for the appraisal of impacts that will result from proposed channel deepening activities on the Thames River. In addition, data has been gathered by field personnel on the site of the proposed dredging and in Block Island Sound in order to supplement the background information and render it more pertinent to the current problem.

3.19. General Effects of Spoil Dumping on Benthic Marine Invertebrates. From a knowledge of the behavior and morphology of an animal under natural conditions it is possible to predict its relative ability to resist the pressure of an added layer of sediment and to burrow to the surface. *Nephthys incisa*, a large active polychaete, burrows freely through dense sediment. This species would be expected to attain the surface after relatively deep burial. Smaller animals of any type, however, have the greatest chance of being destroyed. The fate of colonies of ampeliscid amphipods is of special interest because of the effect of their tubes in determining the nature of the sediment surface. They are not adapted for burrowing and are probably destroyed by shallow burial. They are, however, able to extend their tubes above a rapidly aggrading surface.

3.19a. A burial experiment was conducted by URI with animals from the lower Providence River in order to assess their likelihood of surviving the dredging and dumping operation and becoming established on the offshore site. Sediment samples were taken with a Smith-McIntyre bottom grab. The upper 3 cm containing most of the animals was separated from the dense subsurface sediment. Three cm of the mixed surface sediment was placed in 10 small aquaria (27 x 14 cm) and buried with up to 21 cm of subsurface sediment. One half of the surface was sampled after 24 hours and the remainder after 48 hours. The samples were passed through a 0.75 mm sieve and the retained animals counted. Fourteen species were recovered, but only three were abundant enough to be considered. *Nephthys incisa* attained the surface in less than 24 hours from all depths. *Streblospio benedicti*, a very abundant, 1 cm long, tube-swelling polychaete, was able to reach the surface through up to 6 cm of sediment, but not through 21 cm

3.19b. Until a sandy bottom is formed over the spoil dump, there will be more fine-grained particles in suspension there than there would be over natural bottom in the area. Filter feeding benthic invertebrates take their food from water immediately off the bottom. Any excess suspended sediment must be either ingested or sorted from food particles before ingestion. The increased concentration of suspended particles in the water during the dumping operation and after resuspension could affect animals by causing mechanical damage to respiratory surfaces and by diluting the food particles utilized by filter feeders with non-food particles.

3.19c. Sewage sludge and the highly organic sediments of inner harbors have a high oxygen demand. Reduced chemical compounds take up oxygen immediately while bacteria consume organic matter producing a biological oxygen demand continuing over a longer period. If these sediments are dispersed in a body of water with restricted mixing, dangerously low oxygen levels should be produced. Measurements of dissolved oxygen over the sewage sludge dumping grounds in New York Bight showed reductions from 7 ppm to less than 1 ppm three feet above the bottom.

3.19d. Animals buried by anaerobic sediments may die of anoxia before they can reach the surface. The most vulnerable group of animals is probably the small crustaceans whose response to oxygen deficiency is increased ventilation. Bivalve molluscs incur oxygen debt, while some polychaetes lower their activity and metabolism when oxygen is low (74). These mechanisms would aid escape from burial.

3.19e. Sediments with a high percent of organic matter will remain anaerobic beneath the surface. Bader (2), states that more than 3% organic matter in sediments may limit the concentration of non-tolerant infauna. The species found in Providence Harbor are examples of animals physiologically and behaviorally adapted for survival at low oxygen levels. Bivalves (Mya) and polychaetes (Streblospio and Pectinaria) occupy tubes and have efficient pumping mechanisms to carry dissolved oxygen to respiratory surfaces. Adults and larvae of Polydura ligni can tolerate oxygen concentrations as low as 1.5-2.5 ppm and 0.6-2.1 ppm, respectively (88). The deposit feeding polychaete Capitella capitata survives in highly polluted low oxygen sediments throughout the world (86).

3.19f. Concentrations of hydrocarbons, even though below toxic levels, may have adverse ecological effects. Blumer (5), suggested that certain oil fractions could interfere with the chemical senses of marine animals. These mediate finding of food, escape from predators, selection of habitat, and sex attraction. On the spoil dumping ground, hydrocarbons could change the settling pattern of the larvae of benthic invertebrates or interfere with the ability of lobsters and crabs to find food.

3.19g. Non-polar chemicals are many times more soluble in oil than in water and will become concentrated in sedimented oils. Hartung and Klingler (47) reportedly calculated an empirical concentration factor of one million for DDT in an oil-water system. Although traces of dieldrin and chlordane have been found in quahogs from the Providence River (R.I. Dept. of Health), total pesticide input probably has been quite low (78). Polychlorinated biphenols, which are widely used in plastics manufacture, are as toxic as chlorinated pesticides and would be expected to be concentrated in oil.

3.19h. Toxic substances in oil would have varying effects on different species on the dump site. Detritus feeders and their predators would assimilate higher concentrations of these substances than would filter feeders which are consuming phytoplankton from unpolluted waters (76, 123). Crustacea are particularly sensitive to pesticides and heavy metal poisoning and may be the first group to show the effects of sediment pollution.

3.19i. At the National Marine Water Quality Laboratory, West Kingston, Rhode Island, various workers are studying the concentrations of heavy metals in the sediments and benthic invertebrates of the Providence River and the toxicity and histopathologic effects of these metals on invertebrates and fish. The metals being studied include gold, silver, copper, cadmium, zinc, lead chromium, nickel and mercury. Each of these metals has unique physical-chemical and biochemical characteristics.

3.19j. Phelps (81) found that uptake of several metals was high in polychaetes overwintering in subsurface sediments. Apparently, both the physiological state of the animals and the physical-chemical characteristics of the interstitial water determined the rate of uptake.

3.19k. While it is possible that the levels of toxic metals in heavy polluted sediment may cause the death of some infaunal species, the possibility of these becoming concentrated in species eaten by man is probably of greater importance in consideration of spoil dumping at sea.

3.19l. The densest populations of subtidal filter feeders are found on well-sorted fine sand bottoms, an indication of an environment with moderate circulation and physical stability (101, 8). Deposit feeders, those that either select food particles from the sediments or inject the sediment completely, are more abundant on fine sediment where more food is found on the bottom than is available from weak currents. Sanders (101) correlated high numbers of small deposit feeders with sediments with 20-40% clay.

3.23.o. It must be admitted that there exists in this area the possibility of impacts of unknown form and severity. Saila et al (98) have reported no acute toxicities from spoil sediments currently at the Rhode Island dump site and have noted that re-colonization of the area by many biota, both sessile and motile and both benthic and pelagic, is occurring. This gives hopeful evidence that these unknown impacts may be relatively harmless, but only further intensive study of this site and others, both during and for several years following dumping, will allow a final judgement to be made as to the existence and extent of these impacts. It is primarily for this reason that containment is the chosen mode for disposal of the Thames River spoils and that a previously spoiled site was selected over unspoiled sites. It seems only prudent to avoid exposing unspoiled areas to a possible impact whose form is as yet unknnown.

3.24. Summary of Impacts to Benthic Invertebrates Incurred by Utilization of the New London Dumping Ground. On the area of the proposed dump site in the Long Island Sound, the predominantly sand-silt-clay bottom is dominated by the amphipod community described in Section 2.17. As indicated in Section 2.17, polychaetes and pelecypods are also present in this community. The tubes of the amphipods are important in determining the nature of the spoil surface; however, in Section 3.19, it is explained that these forms are not adapted for burrowing and would have the greatest chance of being destroyed by spoil dumping. The polychaetes are much better adapted for burrowing, as indicated in Section 3.19.a., and many of these species would be able to attain the surface.

3.24.a. The organic pollution likely to be present in spoil would cause low levels of oxygen due to the high level of demand by decay organisms. As described in Sections 3.19.c. and 3.19.d., crustaceans are particularly vulnerable to injury as a result of burial by anaerobic sediments.

3.24.b. Toxic substances present in sediments including hydrocarbons, and heavy metals may have severe effects on the benthic species present at the dump site. As indicated in Section 3.19.h., crustacea are particularly sensitive to pesticide and heavy metal pollution. In Section 3.19.j., it is shown that in polychaetes the tendency to accumulate metals is high. Since these forms and certain amphipods are important in food chains of higher marine animals, there is a danger of these becoming concentrated in species eaten by man.

3.24.c. The rate of recolonization of the spoil will be a function of the extent to which benthic invertebrates are attached to and can survive on the new surface. As explained in Section 3.20.a., an important aspect in the colonization of new bottom is the ability of many benthic species to select the surface on which they settle.

3.24.d. Studies on the dump site in Rhode Island Sound show that the spoil was colonized by amphipod and polychaete species which were present in amphipod colonies on the surrounding sand bottom. As indicated in Section 3.20.h , there seems to be little possibility that benthic invertebrates from the spoil source area will become established. It is logical to expect from this information, therefore, that once the spoil develops a stable surface with grain-size distribution similar to the condition before dumping (as predicted by the URI investigators) the amphipod dominated community of the surrounding substratum will become established on the spoil dumped in the New London dump site.

3.25. Summary of Impacts to Shellfish Incurred by Utilization of the New London Dumping Ground. The major mollusk species that would be affected by dumping in the proposed site are pelecypods. Recent research has shown that silt can have very adverse effects on some shellfish. As explained in Section 3.21, reproduction and pumping rates in oysters have been demonstrated to be reduced with small increases in silt. High concentrations of silt have been shown to slow the development of hard clam larvae. In Section 3.21.a., burial experiments are described in which it is shown that bivalve mollusks, such as certain clams which move vertically, are expected to recover from burial. However, the inability to filter feed in a selective manner may prevent these mollusk species from colonizing the dump site. As described in Section 3.21.c., many estuarine bivalve mollusks are able to sort sediment particles. It is suggested, however, that species outside the estuary may be less efficient at limiting their intake of mineral matter. This could cause a decline in overall productivity of bivalve mollusks in the dump site after deposition of the spoil. In addition, the eggs of these mollusks may be very adversely affected by siltation.

3.25.a. Lobstering is carried on throughout portions of the Long Island Sound in summer. In experiments conducted by the University of Rhode Island, and described in Section 3.21.d, lobsters were exposed to suspensions of up to 3200 ppm of silt; no mortality was recorded that is directly attributable to sediment concentration. In further experiments with lobsters and crabs in an aquarium with dredge spoil and sewage, these species remained alive for extended periods. It can be fairly stated that there would be no mortality of crabs and lobsters in the dump site caused by sediment alone. However, with scavengers such as the lobster and the filter feeding pelecypods, there is the long range danger of accumulation of toxic compounds present in the spoil and passing these to man through the food chain.

3.26. Summary of Impacts to Finfish Incurred by Utilization of the Long Island Dumping Ground. The finfish species of commercial importance that inhabit the vicinity of the Long Island Sound dump site are described in Sections 2.17.g. to 2.17.1. Recent research conducted on the effects of silting on marine fish have shown that many species are able to tolerate high concentrations of suspended sediments for short periods. Experiments exposing fish to mineral solids and effluent are described in Section 3.22. The results of these and other experiments indicate that the effects of silting on the adults of finfish species around the dump site would be very small. However, damage to eggs could be very significant.

3.26.a. Other investigations have indicated that toxic substances in oil could adversely effect the chemical senses of some fish. This is referred to in greater detail in Section 3.22.a. Some additional impacts of spoil dumping activities on finfish that have been suggested are reduction of visibility of food organisms, destruction of spawning areas, and absorption of toxic or unpalatable substances, all referred to in Section 3.22.b. In general, the immediate impacts to fisheries in the dump site area do not warrant serious consideraion except for the eggs of demersal species. The long range impacts worthy of consideration are the accumulation of pollutants in fish through the food chain. In some species, certain toxins might attain the threshold level of tolerance, reducing fitness in individuals and survival within the area population.

4. ANY ADVERSE ENVIRONMENTAL EFFECTS WHICH CANNOT BE AVOIDED SHOULD THE PROJECT BE IMPLEMENTED

4.01. Water Quality. It is apparent, based on information presented in section 3.05, that the proposed dredging in the Thames River will produce changes in varying magnitudes with respect to parameters that influence water quality. The effects of such changes will obviously depend upon their magnitude and duration. It is felt, however, that dredging in the Thames River will not greatly alter water quality and that conditions will return to ambient within a short period of time.

4.01a. Although the parameters measured determine water quality, it is felt that none will change enough to be of major concern. The most advanced effects would probably result from the release of chemical constituents and oil and grease from the bottom sediments. In addition, the increase in turbidity would result in greatly decreased light penetration in the dredge area. However, the solid material that is introduced into the water column from the bottom sediments and dredge will resettle at a relatively rapid rate. Thus, turbidity will be reduced and returned to ambient a short distance away. In addition, chemical constituents and oil and grease which have the potential of greatly effecting water quality will also return to ambient a short distance from the dredging operation.

4.01b. The EPA reports areas of high fecal and coliform counts which are well above the standard for SB water. It is possible that coliform bacteria would be released from the sediments as a result of dredging. However, even this adverse condition would not greatly alter the water quality as the EPA already records coliform counts well above SB standards. Thus, this important parameter is not a factor in the dredging operation. Coliform bacteria would be expected to return to ambient a short distance from the site.

4.02. The most adverse effects of dumping on water quality would result from the presence of heavy metals andother pollutants including coliform bacteria, other pathogens, and grease and oil. Turbidity increase in the dump area will also be an adverse effect. However, the material will settle out, and ambient conditions should return within a short period of time. The plume generated by dumping the sediments can be expected to be highly variable in density and extent. Its form will be determined by a number of variables, including tidal velocity, tidal direction, time of dumping, cohesiveness of a given load, and care with which the scows are maintained and operated. The complexity of the governing phenomena precludes a prediction of the actual extent of the plume, but it can be expected to reach several thousands of feet during the most adverse conditions. It should be noted that the adverse effects of increased turbidity, and increased concentrations of heavy metals, nutrients, BOD, COD and pathogens, as well as low DO may be of longer duration near the bottom, resulting in decreased water quality in the lower water column just above the bottom sediments.

4.03. Benthic Invertebrates. The impacts of most severe consequence to benthic invertebrates of the dump site would occur to ampeliscid amphipods, tiny crustaceans which are the predominant forms at the site. These organisms are significant in the

food chains of higher marine life, certain groups of which are commercially important. These amphipods are particularly susceptible to killing by burial since they are not adapted for burrowing. These forms are also very susceptible to injury or death due to anoxia. The effects of toxic substances present in the spoil material would be particularly great for these amphipods since they are shown to be sensitive to pesticide and heavy metal pollution. Furthermore, due to their importance in food chains of higher marine organisms, heavy metals that may accumulate in these species would become concentrated in species of fish and shellfish eaten by man. Accordingly, the immediate impact of spoils dumping on benthic invertebrates at the Long Island dump site would be destruction of one of the dominant forms of organisms; long term adverse impacts may be accumulation of toxic substances at the base of the food chain and passing these to higher organisms.

4.04. Shellfish. The adverse impacts that would be of greatest significance for shellfish of the dump site area would occur to populations of certain pelecypods in the vicinity of the site. The larvae of the species are very vulnerable to injurious effects of turbidity and high concentrations of silt will slow development of the larvae. This may reduce overall productivity of this species in the direct vicinity of the dump site throughout the period of dumping. In addition, the eggs of this species would be adversely affected by siltation and a proportion of them would fail to develop. The likelihood that these pelecypods might be less efficient at sorting sediment particles could limit the numbers of this species that would continue to survive on the site throughout dumping and for a period following settling and resorting of the surface. The long-term adverse impacts of spoil dumping on both the pelecypods and lobsters in the vicinity of the site may be the concentrating of spoil toxins in flesh to levels unacceptable for human consumption or to levels that would exceed tolerance threshold limits of these organisms. In addition, pathogens from the Thames River sediments may adversely affect the shellfish populations within the influence of the dump zone. The possibility or extent of this effect, or its significance is unknown to the scientific community at this time.

4.05. Finfish. Several finfish species that are of commercial importance may be adversely impacted by disposal of spoil at the Long Island dump site. The eggs of demersal species such as blackback flounder and yellowtail and certain industrial species may suffer a decline of total numbers, reducing overall productivity of these species. Winter is the critical period for certain species such as the flounder which breed at that time. A direct effect of siltation on larval forms of these fish species would be reduced growth and survival rate of certain stages. These effects of siltation on eggs and larvae would be expected to extend throughout the period of dumping and afterward. Major impacts of dumping on adult forms which are related to social behavior and food finding would also be expect[ed] to occur for this length of time. The

aesthetically unpleasing.

5. ALTERNATIVES TO THE PROPOSED ACTION

5.01. Do-Nothing. The adverse effects associated with dredging and disposal of spoil would be avoided if the project is not implemented. The effect on the National Defense, however, would be incalculable since the new SSN 688 class submarine would be unable to utilize the facilities at the New London Submarine Base for full tactical development of the craft. Secondly, indirect economic benefits to other shipping would not be realized nor would currently hazardous navigation conditions north of the Route 95 bridge be corrected.

5.02. Alternative Locations for the SSN 688. The basic purposes of the proposed project, as indicated in paragraphs 1.13 through 1.15, require that Submarine Base, New London, be capable of supporting SSN 688 class submarines. It has been estimated to furnish another site with the facilities existent at New London would require an expenditure of 150 million dollars in addition to the cost of adequate piers and a new submarine tender. Total cost for the New London project, as indicated in this report, is approximately 10 million dollars.

5.02.a. Secondly, the only Development Group that can fully develop the tactical ability of the SSN 688 is located in New London and their work is to be executed at the Underwater Sound Systems Lab utilizing the State Pier to outfit the craft.

5.02.b. In summary, the total investment already made in the facilities located on the Thames River that would have to be duplicated elsewhere is 184 million dollars.

5.03. Alternative Dredging Methods. The question often arises as to which dredge type or method is least environmentally damaging. The Corps of Engineers states that there is no known dredge which can operate without creating some environmental disruptions. However, because of man's use of his environment, dredging is still a necessity.

5.03.a. Basically, according to the Corps of Engineers, hydraulic and bucket (clamshell, orange peel or clipper dredges) are used in the maintenance of New England rivers and harbors.

5.03.b. The hydraulic dredge operates on a vacuum principle and consists essentially of a centrifugal pump which draws in a mixture of water and sediment. This mixture is generally composed of 80% to 90% water and only 10% to 20% excavated material. The spoil is discharged through a pipeline system to either a land-based spoil bank or barge. Very little visible water surface effects are produced by pipeline to land spoil disposal. The turbidity plume created by the hydraulic pipeline dredge is the major objection to its use. Spill-over back into the water can occur if the spoil discharge area is not properly diked. Navigation can temporarily be obstructed by the pipeline system.

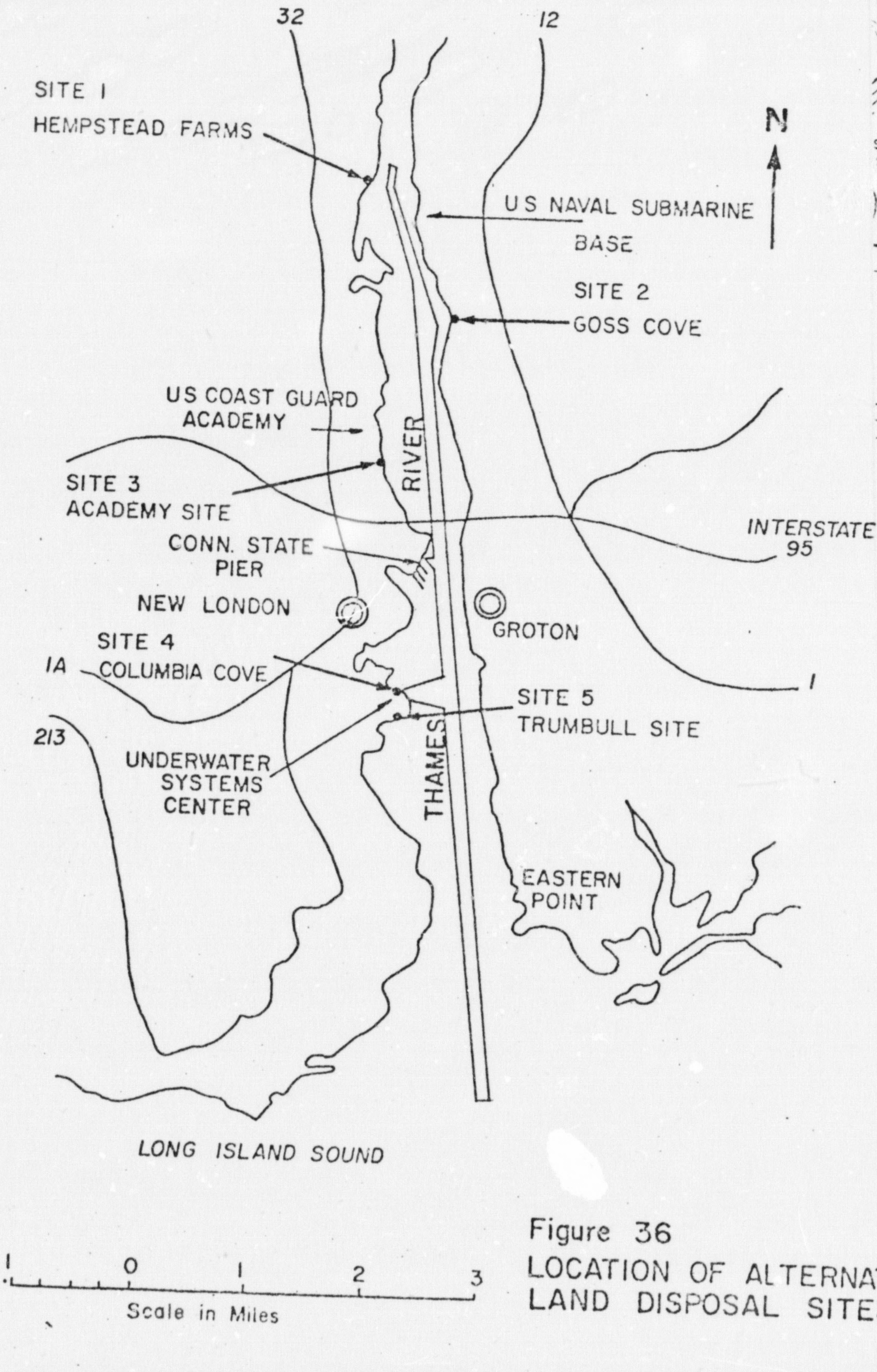
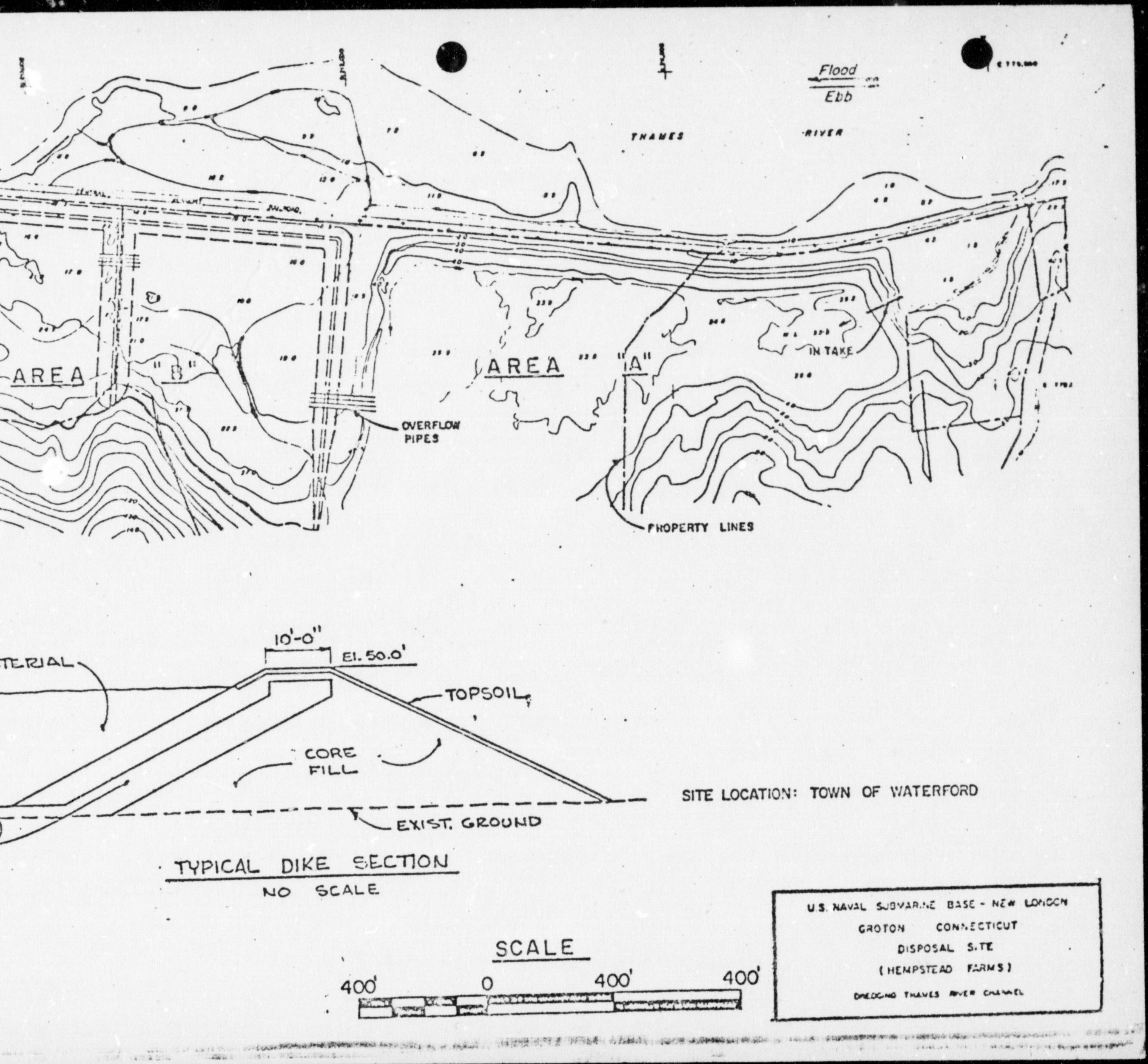


Figure 36
LOCATION OF ALTERNATIVE
LAND DISPOSAL SITES

cline in overall value of this area as a feeding location for fish. The



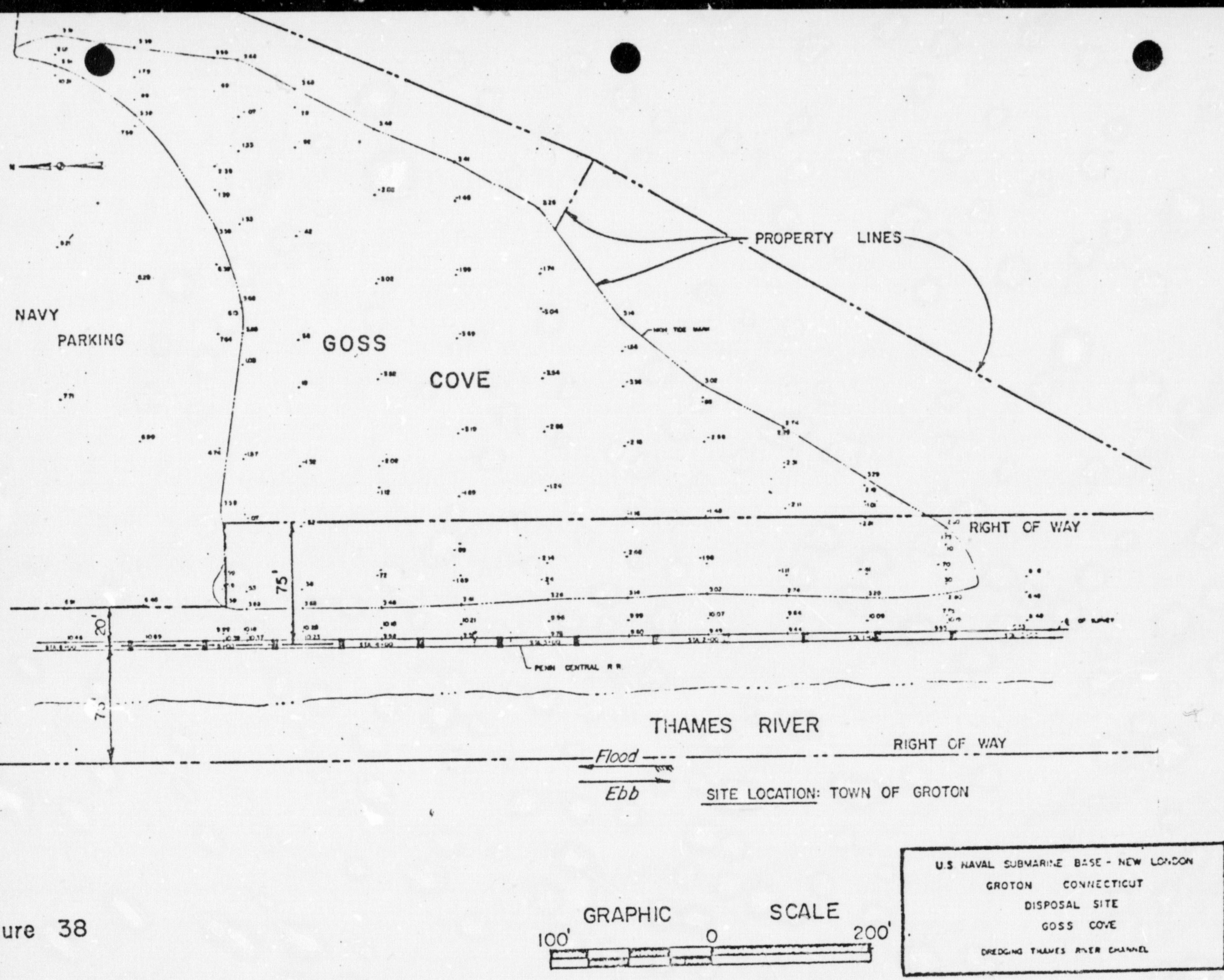

NAVY
PARKING
GOSS
COVE
PROPERTY LINES
HIGH TIDE MARK
RIGHT OF WAY
75'
20'
75'
PENN CENTRAL R.R.
THAMES RIVER
RIGHT OF WAY
Flood
Ebb
SITE LOCATION: TOWN OF GROTON
GRAPHIC SCALE
100'
0
200'
U.S. NAVAL SUBMARINE BASE - NEW LONDON
GROTON CONNECTICUT
DISPOSAL SITE
GOSS COVE
DREDGING THAMES RIVER CHANNEL

Figure 38

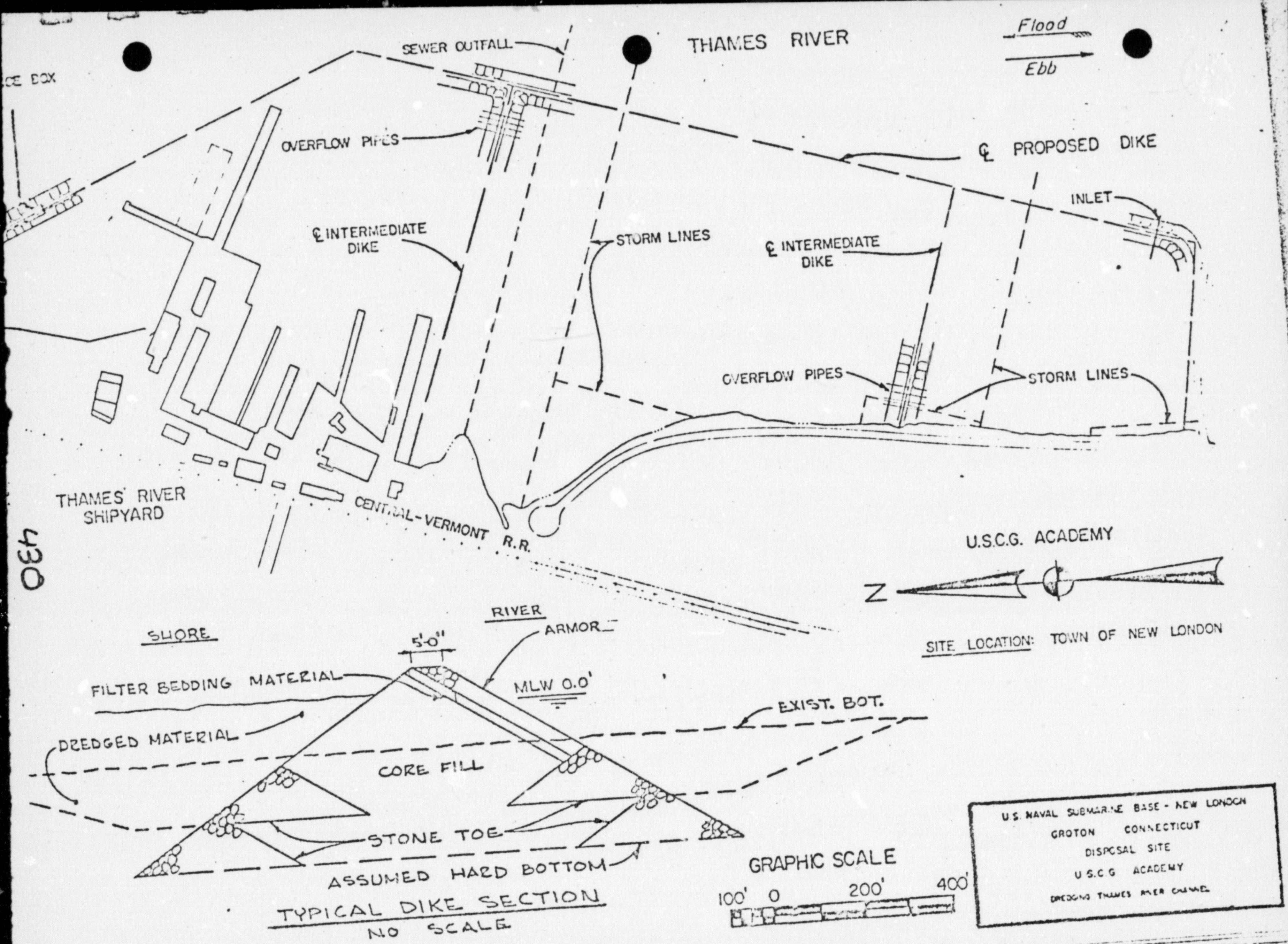
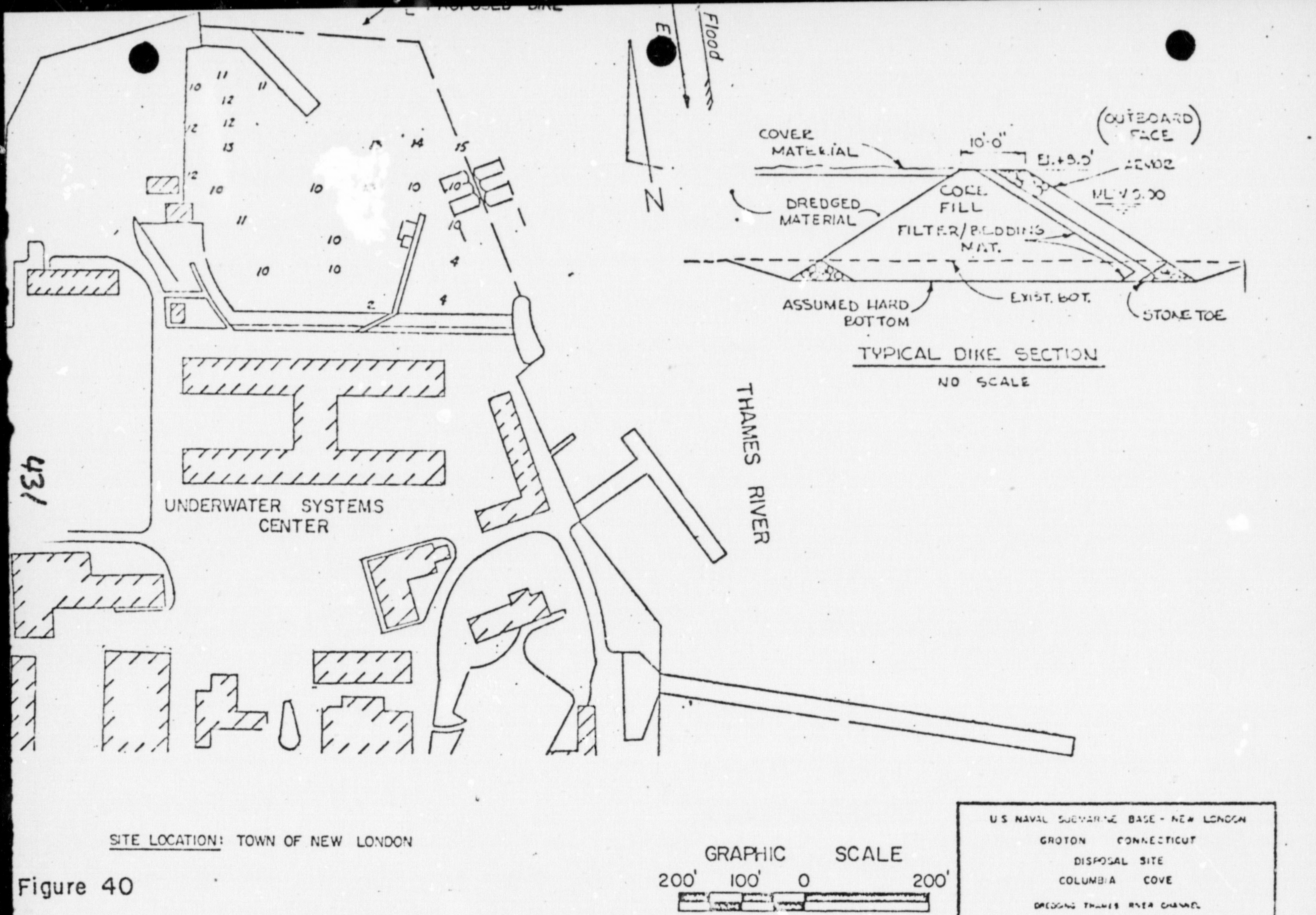

THAMES RIVER
Flood
Ebb
SEWER OUTFALL
OVERFLOW PIPES
℄ PROPOSED DIKE
INLET
℄ INTERMEDIATE DIKE
STORM LINES
℄ INTERMEDIATE DIKE
OVERFLOW PIPES
STORM LINES
THAMES RIVER SHIPYARD
CENTRAL-VERMONT R.R.
U.S.C.G. ACADEMY
N
SITE LOCATION: TOWN OF NEW LONDON
SHORE
RIVER
5'-0"
ARMOR
FILTER BEDDING MATERIAL
MLW 0.0'
EXIST. BOT.
DREDGED MATERIAL
CORE FILL
STONE TOE
ASSUMED HARD BOTTOM
TYPICAL DIKE SECTION
NO SCALE
GRAPHIC SCALE
100' 0 200' 400'
U.S. NAVAL SUBMARINE BASE - NEW LONDON
GROTON CONNECTICUT
DISPOSAL SITE
U.S.C.G ACADEMY
DREDGING THAMES RIVER CHANNEL

Figure 39



PROPOSED DIKE
Flood
N
COVER MATERIAL
10'-0"
(OUTBOARD FACE)
CORE FILL
DREDGED MATERIAL
FILTER/BEDDING MAT.
ASSUMED HARD BOTTOM
EXIST. BOT.
STONE TOE
TYPICAL DIKE SECTION
NO SCALE
THAMES RIVER
UNDERWATER SYSTEMS CENTER
SITE LOCATION: TOWN OF NEW LONDON
GRAPHIC SCALE
200' 100' 0 200'
U.S. NAVAL SUBMARINE BASE - NEW LONDON
GROTON CONNECTICUT
DISPOSAL SITE
COLUMBIA COVE
DREDGING THAMES RIVER CHANNEL

Figure 40

17

432

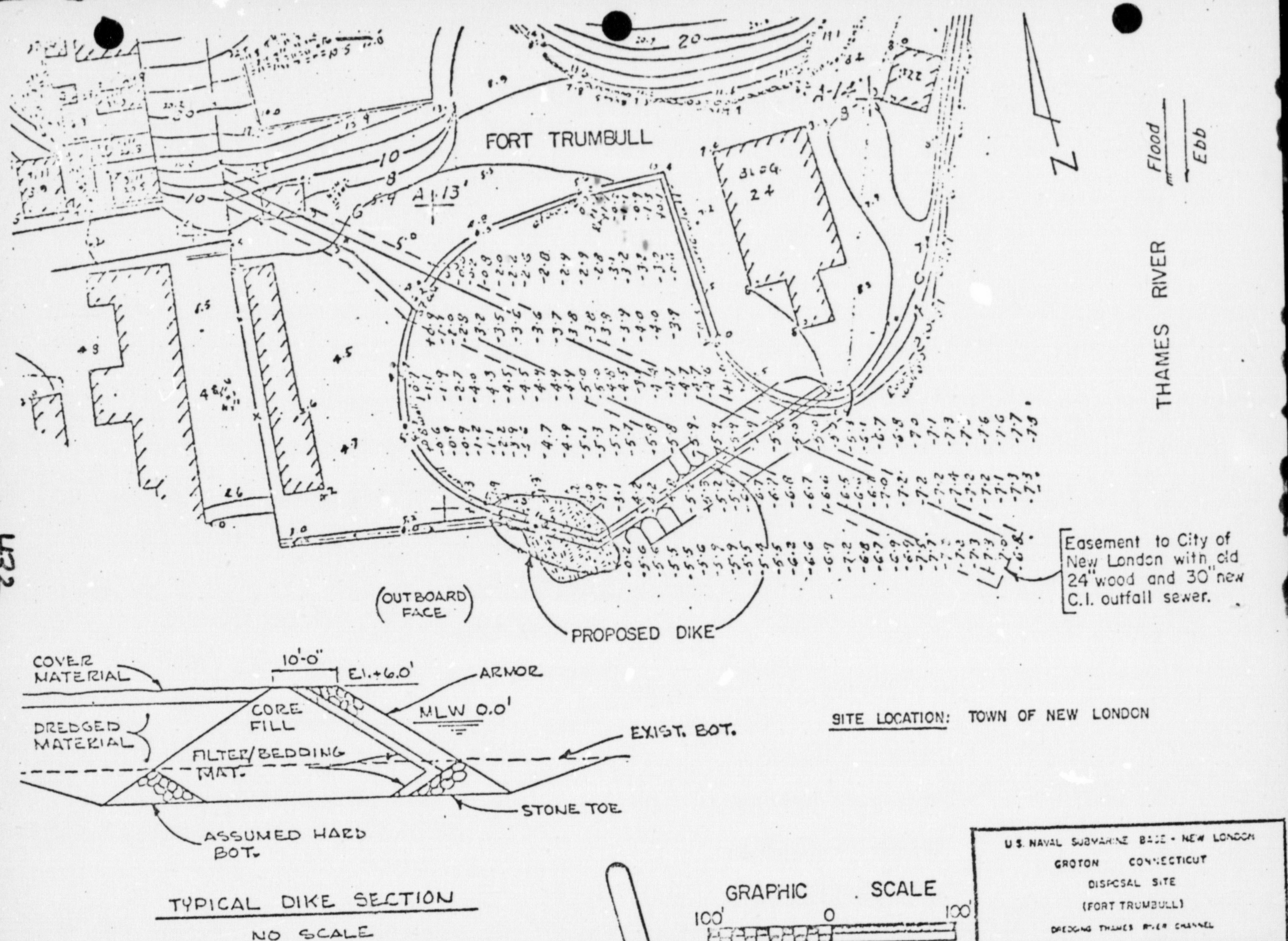


Figure 41

5.03.c. All dredge types disrupt the bottom habitat, smother or damage benthic organisms and release sediments which may reduce D.O. levels at the sediment-water interface and in the vertical water column. Depending on the project, hydraulic dredging and onshore disposal of dredge spoil may require several acres of land. The spoil areas must also be close to the dredging site.

5.03.d. Auxilliary disposal logistic equipment (barges or dump scows) are needed for the bucket dredging method and the size of the project dictates the number of logistic equipment needed. The bucket dredger is capable of operating in shallow or deep water, and hard or soft sediment, but is considerably slower than the hydraulic system.

5.03.e. Deck type or bottom dump type disposal barges are generally used. Dump barges drop spoil through hinge doors in the bottom and the spoil generally drops out in a concentrated mass. This type of spoil disposal requires less time and creates less visible water-surface effects than the deck type barge. The deck type barge is unloaded by using a hydraulic water jet to wash the spoil into the sea, thus creating a large turbidity plume resulting in spreading and spoil over a greater surface area, and may possibly prevent the material from sinking to the desired bottom location.

5.03.f. As a result of the environmental analyses conducted and summarized in this report, the proposed facility will be dredged by a 10 to 18 yard bucket into the largest commercially available scow with a bottom drop.

5.04. Alternative Disposal Areas and Methods. Several alternative methods and disposal areas were reviewed in the course of preparation of the Draft and Revised Draft Environmental Impact Statements. These methods consisted of : total land disposal, part sea - part land disposal, dredge spoil farming, incineration, container disposal, island construction and ocean disposal.

5.04.a. Total Land Disposal. An analysis of the land use of areas contiguous to the Thames River indicates the absence of large undeveloped parcels that could accept the total amount of spoil to be removed from the river. Five potential land sites were investigated in detail and were found to have a total capacity of 1,700,000 cubic yards indicating that sufficient area for total land disposal is not available.

5.04.b. Part Sea-Part Land Disposal. The five potential land disposal sites are indicated in Figures 36, 37, 38, 39, 40, and 41. Site 1, Hempstead Farms, is located approximately 0.2 miles upstream from the Naval Submarine Base on the west bank of the river. The 65-acre area is privately owned and could accept 813,000 cubic yards of dredge spoil. The Electric Boat Division of General Dynamics has acquired options on this area, for disposal of spoil from dredging operations about to be conducted at their facility. As such, spoil dumpage on this site by the Navy may be precluded should General Dynamics' usage of the site utilize the entire capacity of the area.

5.04.c. Site 2, Goss Cove, is located on the east bank of the river opposite the main gate to the Submarine Base. The 2± acre parcel is in both Government and private ownership. The cost of mobilization for this two acre site with a capacity of 17,000 CY is considered excessive, and the ponding area would not be large enough to allow sufficient settling time for solids to deposit from the liquid dredge spoil before discharge of water back into the river. The site is also severely restricted by the Penn-Central Railroad right-of-way. An analysis of the railroad embankment stability would have to be made in order to check the ability of the embankment to sustain the additional lateral loading caused by the disposal of the dredged material. Also, construction easements would need to be obtained from the railroad company for intake and discharge pipes.

5.04.d. Site 3, the U.S. Coast Guard Academy, is located approximately 0.8 miles downstream from the Naval Submarine Base on the west bank. This 40-acre site would be adequate for disposal of 750,000 cubic yards of dredge spoil.

5.04.e. Site 5, Columbia Cove, is located at the Naval Underwater Systems Center - New London Laboratory. This four-acre site would have capacity for the disposal of 82,000 cubic yards of dredge spoil. The ponding area, however, would be too small to allow settlement of the suspended solids from liquid dredge spoil before discharge back into the river.

5.04.f. Site 5, Fort Trumbull, is a 1.5 acre site inadequate in size to allow settlement of suspended solids.

5.04.g. Environmental Effects. Site 1, Hempstead Farms, and Site 3, the United States Coast Guard Academy, are both areas of significant ecological importance. The Department of Interior, Bureau of Sport Fisheries and Wildlife, Boston, Massachusetts, opposes filling of Site 1, as it encompasses a significant waterfowl resting and feeding area. Site 3 has been identified by the Bureau of Sport Fisheries and Wildlife as a significant spawning and nursery area for a variety of fish species. As a result, these two alternatives have been dropped from consideration. The remaining three areas, having a total capacity of 115,000 cubic yards, are inadequate in size to allow proper settlement of the liquid spoil material resulting in turbid plumes being spilled into ecologically sensitive shoal areas. For reasons of environmental impact, inadequate size, and economics, the alternative of part sea-part land disposal has been considered both imprudent and infeasible.

5.04 h. Dredge Spoil Farming. There are several possibilities for using the dredged spoil for rejuvenation of areas which have been denuded of fertile soils. There is a research project in Maryland called "Tidal Marsh Project" which shows considerable promise for the upgrading of coastline area using spoil as a media for planting aquatic plants. To this date, there is insufficient information to justify large-scale use of the spoils in this manner.

5.04. i. Strip mines present another alternative for the use of dredge spoils. Spoils applied to these denuded areas could improve conditions sufficiently to allow revegetation.

5.04. j. The spoil could also be applied as a mulch or fertilizer on crop land.

5.04. k. The drawbacks to these alternatives include great distance and transportation costs in addition to the political jurisdictional problems associated with long distance transportation of the spoils, truck or rail traffic with the resultant increases in noise and air pollution, possible leaching of toxic materials from the spoils and the subsequent contamination of land and water resources.

5.04. l. Incineration. Incineration of dredge spoils to breakdown the organic and toxic materials is another possible alternative. Such an operation could be land or ship based. Lockheed Shipbuilding and Construction Company, Seattle, Washington, has designed a waterborne waste treatment system utilizing old ships hulls. A similar system could be developed utilizing an incinerator which could handle both municipal and industrial waste in addition to neutralizing dredge spoils. Heat and electric power could be a functional by-product of this kind of operation. The problems associated with this approach include possible air pollution, possible adverse affects of the ash residue in an ocean ecology and the large time factor necessary for the development of a workable system. In addition, the cost would be substantially greater at the outset than other methods.

5.04. m. Container Disposal. The Army Corps of Engineers, New England Division, in an environmental impact statement concerning improvement dredging to Fall River Harbor, considered the possibility of placing all dredged material in a double wall steel sheet pile container. It was proposed that the container be located in the Spar Island area in Mount Hope Bay. On the basis of the quantity of sediment to be dredged, 4 million cubic yards, a container approximately 3,000 feet in diameter and extending 7 feet above mean sea level would be required at a cost of $12-$15 million dollars. The statement pointed out that pollution in the dredged material would be retained, the maintenance material for the next 40 to 50 years from that project could be contained and an island of about 200 acres created.

Again, construction cost is the major objection to the alternative. Other problems would involve selection of a suitable site where the structure would not obstruct navigation or be considered aesthetically unpleasing.

5.04.n. Island Construction. The creation of islands from dredge material has both beneficial and adverse effects on the environment. Islands created from spoil could be used as recreational areas or for municipal needs such as airports, power plants, waste treatment plants, or incinerators. Against the development of such islands is the lack of information concerning the impact such construction would have on marine life in the area. An extensive environmental impact study would need to be completed before such a project could go forward. Impediment to navigation and aesthetics in the areas chosen are also negative aspects which must be considered. Not all material from dredging operations is suitable for island construction. Much of the dredged material would be unsuitable and would need to be separated and disposed of elsewhere. A feasibility study is being done by the Corps of Engineers for the City of Baltimore, concerning island development disposal of dredge spoil from the Baltimore Harbor Channel, a situation similar to that in New London. Information useful in future disposal will undoubtedly come from this study and a proposed experimental site in Lower New York Bay also under Corps consideration. Currently, a project of the Norfolk District Office of the Army Corps of Engineers utilizing a 4-square mile disposal island in the Elizabeth River is underway. Reports concerning methods and cleanliness of the project have been favorable. There are two additional drawbacks, however, one being the cost of utilization of disposal islands would be exceedingly high under current practices and second, there would be jurisdictional problems surrounding control of ultimately chosen sites.

5.04.o. Ocean Disposal, Dispersal Sites. In light of the type of material to be excavated from the Thames River, a dispersal form of ocean dumping has been suggested by many authorities in the field. The rich biota of the area as indicated in section 2.17, especially in terms of finfish and lobstering and the lack of knowledge concerning the physiological impacts to these organisms caused by pollutants substances, even at the levels found in the Thames River, precludes dumping in these areas until more detailed long-term impact information is available. Short-term impact is not seen as serious since the majority of finfish in the Race Point area as shown in Figure 31 are pelagic. Also, lobsters and crabs are fairly mobile and able to escape dumping operations and short-term high level turbidity changes. The second dispersal site, 23± nautical miles from the mouth of the Thames River, as shown in Figure 30, has not been carried forward as the disposal site, for much the same reasons as indicated above, and secondly, the possibility of turbidity currents being induced by spoil deposition and the more dense turbid waters being carried into deep Block Channel. The effects of adding pollutants to deep ocean areas has not been researched and current opinion advises against it. The possibility of the movement of the Thames River material from the dispersal site to deep ocean areas has therefore made the choice of a monitored containment site more viable.

5.04.p. Ocean Disposal - Containment Sites. Alternative containment sites have been investigated on the basis of existing and limited generated data. These containment sites are shown in Figure 30. Option Site 3 encompasses the three ocean basins located east of Fisher's Island. Bottom depths range from 200 to 300 feet, and diameters are on the order of one mile. The bottom materials are predominantly sands with less than 10% silt and 2% to 4% clay. The benthic invertebrates most abundant in the vicinity of this site include suspension and detritis feeding amphipods, isopods and foraminifera. Contributing to the faunal diversity of the site are representative species of pelecypod and gastropod mollusks. These shellfish and their larvae, in addition to the small crustaceans and foraminifera, represent major items in the diets of commercial and recreational fish species such as bluefish, flounder, menhaden, scup and striped bass. Small organisms such as amphipods and isopods, lacking great burrowing ability, have the greatest chance of being destroyed by even a shallow burial. Organic silts that comprise the bottom sediments of Thames River would produce anoxic conditions within the pile. While the smaller organisms would be killed off, certain bivalve mollusks are adapted to survive these conditions. Crustacea such as amphipods and isopods that feed on detritis are particularly sensitive to pollutants and other toxic substances in the spoil. Bivalve organisms are also able to move vertically through sediments and so would not suffer great loss from burial. Effects of containment dumping on local fish populations would not be severe since these forms are mobile and can temporarily avoid the site until turbidity settles. Also the bottom material is fairly cohesive. However, if spoils are deposited during spawning periods, this activity could generate major impacts on certain fish. In general, with the exception of Cod (where detailed information is not available) one can assume that the impact of dumping would be less during the winter months. Most species lay eggs which are pelagic and, therefore, are not as susceptible to silt as those whose eggs fall to the bottom, such as Winter Flounder.

5.04.q. From the analyses available, to date, option Site 3 affords the best location for an alternative spoil disposal site. It lacks, however, the more detailed physical, chemical and biological analyses that have been and are being conducted on the selected dump site in Long Island Sound.

5.04.r. Alternative containment Site 2 is located in the plains area northwest of Block Island. Approximate depth is 110 feet and the plain is several miles in diameter. The bottom materials consist of silty sands containing more than 25% silt and 5% to 6% clay. The most abundantly represented benthic forms in this area are amphipods. Polychaetes and bivalve mollusks are also abundant, though considerably less so than the amphipods. All of these organisms are major items in the diets of many species of fish, particularly the amphipods. The abundance of these small crustaceans taken in sampling grounds adjacent to this option site makes the area very valuable feeding ground for fish, many of which are commercially important. Included are flounder, menhaden, porgy, and striped bass.

5.04. s. The impacts of spoils dumping on these tiny crustaceans would be the destruction of large populations with a commensurate decline in overall value of this area as a feeding location for fish. The polychaetes and mollusks would be less adversely effected since they have the capability of burrowing upward. The attached sessile species such as oysters, however, are killed by burial. During winter, this species is particularly susceptible to sedimentation. At this time, oyster are relatively inactive and cannot remove silt. Effects on the local fish populations could be quite significant if the material were deposited during spawning. Impacts to populations of adults, however, would not be as great. Recolonization of the spoil by amphipods, polychaetes and bivalve mollusks would occur from the edges of the spoil. Occupation by organisms present in the dumped spoil would be small compared to colonization by populations of organisms native to the dump site vicinity.

5.04. t. Little is known of alternative containment Site 1, other than the fact that deposition is occurring indicating a non-erosive environment. Detailed information on the benthic forms is lacking but a comparison of water chemistry and bottom substrate between this and the subaqueous plain area indicates that the species and impacts discussed in Section 5.04s may be applicable to this site. The lack of detailed information precludes the use of this area as a possible containment site at this time.

6. RELATIONSHIP BETWEEN LOCAL SHORT TERM USES OF THE ENVIRONMENT AND ENHANCEMENT OF LONG TERM PRODUCTIVITY

6.01 The Thames River from the Naval Submarine Base to Long Island Sound has been important to commercial shipping and naval activities since before the turn of the century. The proposed dredging of the river channel will allow the Naval Submarine Base to accommodate the new SSN 688 submarines. This is consistent with past operations at this Base and would certainly be to the Navy's short and long term advantage. The dredging and disposal operations have both long and short term affects on the environment. The short term affects will include increased turbidity, loss of localized populations of benthic organisms at both dredging and dump sites and possible loss of finfish population in the immediate environs of the dredging and spoil sites as a result of increased BOD or the dispersion of toxic chemicals contained in the sediments. The affects at the dredging site are presumed to be short term since past dredging practices have not resulted in permanent loss of finfish or benthic organism populations. New sediment will be deposited at the bottom of the channel reconditioning it for benthic flora and fauna. The long term affects of ocean dumping will depend on the site chosen and the method of deposition used. Even though this information is specified, there is little available information on what the long term ramifications are in terms of vegetation, finfish, shellfish or other benthic organisms, or those higher organisms which live on marine biota. Thus there is no way to reasonably predict the effect of ocean dumping on long term productivity of the area.

6.02. Land disposal of spoils would be economically less desirable but in terms of long term productivity it would provide the stimulous for vegetative growth in areas which otherwise would be barren or substantially lower in productivity. There is incumbent with the use of spoil the threat of food chain concentration of the toxic materials which may be present in the spoil. This could result in decreased productivity if lethal levels are reached in consumer organisms.

6.03. Incineration of the spoils to reduce organic content and break down toxic chemicals would seem to offer good prospects for the future. If power can be generated as a by-product, so much the better, but the major benefit of this technique is the definitive of control it exerts over the materials which are potentially deleterious to the environment. The ash resulting would have to be studied to determine feasible means of use or disposal.

6.04. The natural resources in the harbor-river complex and at the ocean disposal site will not be enhanced by the proposed actions of the project. The increase in channel depth will allow greater draft commercial vessels to use the harbor, which may be some economic stimulus to the area. Larger tankers, for example, would be able to use the port, thus reducing costs; and since fewer trips would be required to fill volume quotas, the likelihood of oil spills and harbor contamination would be reduced.

7. ANY IRREVERSIBLE AND IRRETRIEVABLE COMMITMENTS OF RESOURCES WHICH WOULD BE INVOLVED IN THE PROPOSED ACTION SHOULD IT BE IMPLEMENTED

7.01. Dredging of the New London Harbor would initially commit the labor and financial resources required to construct and maintain the project. The removal and disposal of the dredged spoil including all biological resources in the spoil would be additional commitments. Ocean spoil disposal may disrupt and alter irreversibly the ecosystem of the dump site, possibly resulting in alternations of the ecosystem of a much larger ocean area. Dumping of spoil at any location which previously had not been used as a dumpsite will remove the virginal characteristics of the surface materials of that site. Dumping of polluted sediments would render those sediments harmful or useless for the duration of time needed to naturally cleanse the sediments for biological ecosystems which may develop at the dump site.

COPY

COMMENTS

Comments by the Environmental Resources Section, New England Divison, Corps of Engineers, on the draft Environmental Impact Statement, prepared by the Department of the Navy, Naval Submarine Base, New London, Connecticut concerning a proposed navigation dredging project at New London Harbor - Thames River, Connecticut.

The following comments are furnished for consideration:

Project Description

(1) The project description fails to mention an original permit application concerning the dredging and disposal of 73,000 c.y. of material from the vicinity of the Submarine Base Pier. This should be included in the discussion if in fact the pier area is still to be dredged.

(2) The first increment, Long Island Sound to the State Pier, currently under consideration for financial approval FY73, overlaps the Corps' own navigational improvement project proposal. Sediment analysis results from both Corps and Navy sampling are in relative agreement although that of the Navy's is somewhat higher for organics. Discussion should be given on the relationship between the two dredging proposals.

(3) The sea disposal area denoted in the inset in Exhibit "A" (the project map), and other ocean sites, were the subject of discussion during meetings held at the New England Division on 9 and 21 December 1971 and 21 January 1972. Opposition to the site was voiced by the New York Conservation Commission, Division of Marine Fisheries, National Marine Fisheries Service and local fishermen. A disposal site has yet to be determined although the Environmental Protection Agency has recently indicated that they would like to reopen discussions on this aspect of the project. Concurrence from the Bureau of Sport Fisheries and Wildlife, National Marine Fisheries Service, Environmental Protection Agency and Corps of Engineers should be received prior to any operational activity. Selection of a virgin ocean dump area as opposed to one previously authorized and currently active, will necessitate a predisposal study of the bottom sediments, currents and biotic communities. Chemical analysis should be made for comparison of sediments and dominant organisms of the dumpsite with those of the dredge area.

The possibility of utilizing the project for experimental research studies is receiving serious attention and would seem desirous from the standpoint of all agencies concerned. The project, because of its magnitude, would present a unique opportunity to obtain pertinent data which might be used in guiding future decisions along these lines. The scope of any research and the actual disposal site selection will depend essentially on the method of disposal, either dispersal or containment. The Corps of Engineers is desirous of coordinating dredging plans and any research investigation with the Department of the Navy.

Exh. 6B
Exh. J

CODE NO. NORTHNAVFAC
COPY NO. 17

NAVAL OCEANOGRAPHIC OFFICE
WASHINGTON, D. C. 20373

PRELIMINARY REPORT
ENVIRONMENTAL INVESTIGATION OF A DREDGE SPOIL DISPOSAL SITE NEAR NEW LONDON, CONNECTICUT

by

Physical Oceanography Division

NAVOCEANO TECHNICAL NOTE NO. 7300-3-73

May 1973

ABSTRACT

The U.S. Naval Oceanographic Office conducted a multi-phase environmental monitoring program of a dredge spoil disposal site off New London, Connecticut. Phases 1 and 2 were conducted in June and November 1972, respectively. The measurement suite consisted of physical properties of the water, nutrients, bathymetry, currents, and selected heavy metals in sediments. Studies to determine the effect of the disposals on benthic fauna were also conducted. Minor changes in bathymetry were noted. Deposition of dredged waste did not significantly change levels of heavy metals in water or sediment. The current dumping resulted in an initial reduction in total numbers of benthic fauna and number and kinds of organisms per unit area. Phase 3 measurements will be conducted in May-June 1973.

I. INTRODUCTION

In May 1972, the Naval Oceanographic Office was requested by the Northern Division of the Naval Facilities Engineering Command (NORTH-NAVFACENGCOM), to conduct an environmental investigation of a dredge spoil disposal site located near the mouth of the Thames River at New London, Connecticut. The investigation was one of the requirements imposed on the Navy by the Environmental Protection Agency (EPA) before a permit would be issued for disposal of dredge spoil at the site. The permit was required by the Navy to dispose of approximately 92,500 cubic yards of spoil dredged from a pier construction site at the Submarine Base in Groton, Connecticut.

The environmental investigation was divided into three phases; Phase I was to be conducted prior to the disposal of the dredge spoil at the site; Phase 2 immediately after completion of the dredge spoil disposal operation and Phase 3 approximately six months after the completion of the disposal operation. Environmental data collected during each phase of the investigation would be analyzed and compared to assess the effects of the dredge spoil disposal on the marine environment of the site.

Phase I and Phase 2 of the investigation have been completed and the preliminary results are described. Phase I was conducted from 16 through 29 June 1972 and Phase 2 was conducted from 25 October through 7 November 1972. The third phase is tentatively scheduled for June 1973.

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II. PHYSICAL CHARACTERISTICS OF THE ENVIRONMENT

A. Locale and Bathymetry - The spoil disposal site used by the naval facilities at Groton, Connecticut is located in Fishers Island Sound about two miles south of the entrance to the Thames River. The site covers an area approximately one mile square bounded by 41°15.5'N to 41°16.5'N latitude and 72°03.5'W to 72°05.5'W longitude, Figure 1.

A detailed bathymetric survey of the site was made during Phase 1 and during Phase 2 to determine if the deposition of the dredge spoil had caused any significant changes in the bottom topography.

The bathymetric depth soundings were made with a 21 kHz acoustic transducer rigidly mounted to the side of the survey vessel. The acoustic signals were recorded on a Raytheon Model 723 Recorder. Accuracy of the depth sounding system is ± 0.25 feet at 1 to 100 feet. Positioning of the survey vessel was accomplished with a Cubic Autotape Model DM-40 navigation system which has an accuracy of ± 1 meter. During each survey, a series of 26 parallel east-west sounding lines, spaced approximately 70 yards apart, were run at a speed of 5 knots. Additionally, three to five north-south transects were run for control purposes. Ships position was recorded at one-minute intervals along all of the track lines.

The bathymetric data were contoured at one foot intervals although the plotting inaccuracies could be as much as ± 2 meters. Completed bathymetric charts are shown in Figures 2 and 3. Comparison of the charts indicates some changes in the bathymetry resulting from the dredge spoil deposition especially in the north-central section of the disposal site. Greatest changes in the bathymetry occur in the depression which runs in a northwest-

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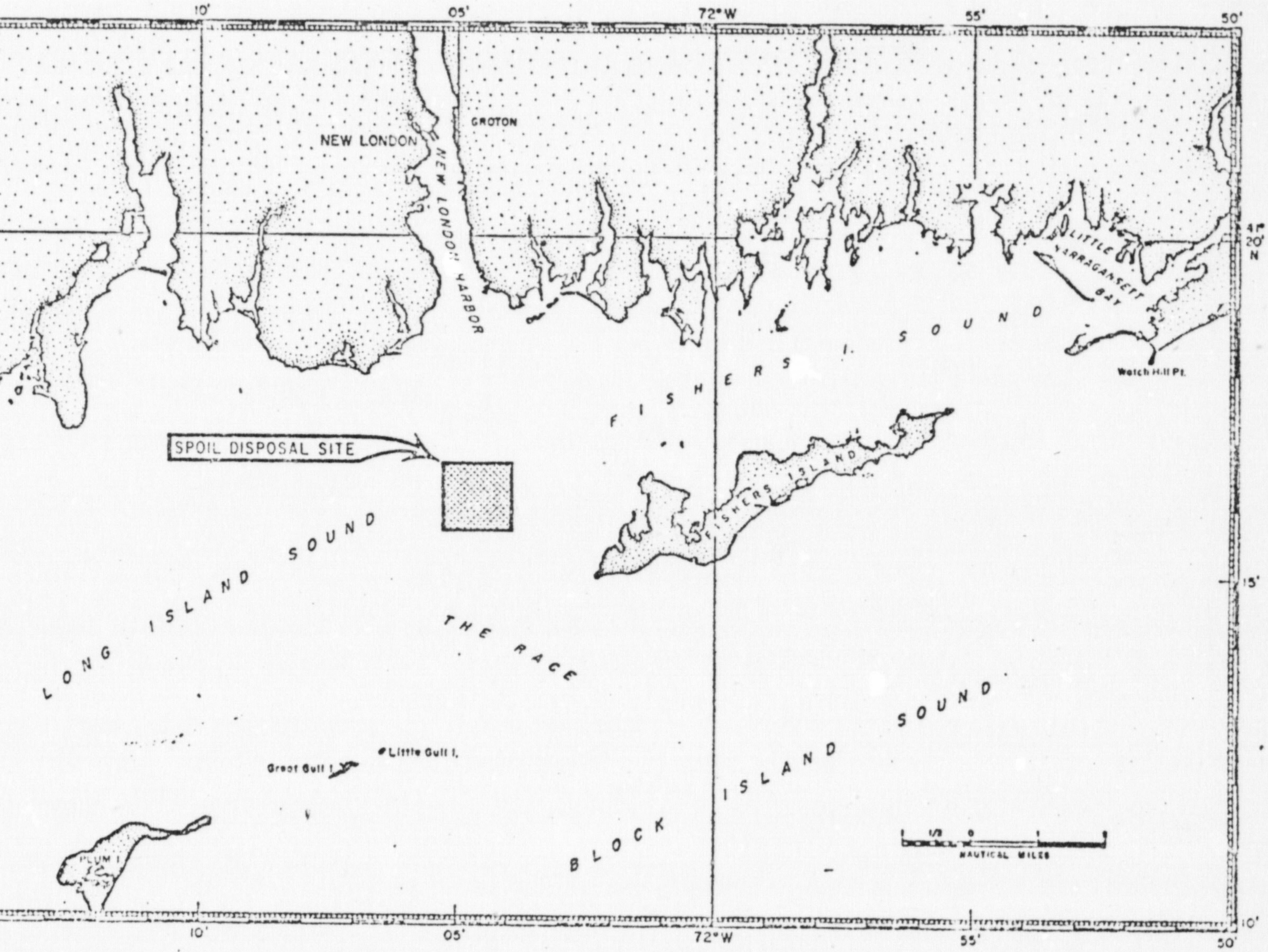

FIGURE 1. DREDGE SPOIL DISPOSAL SITE

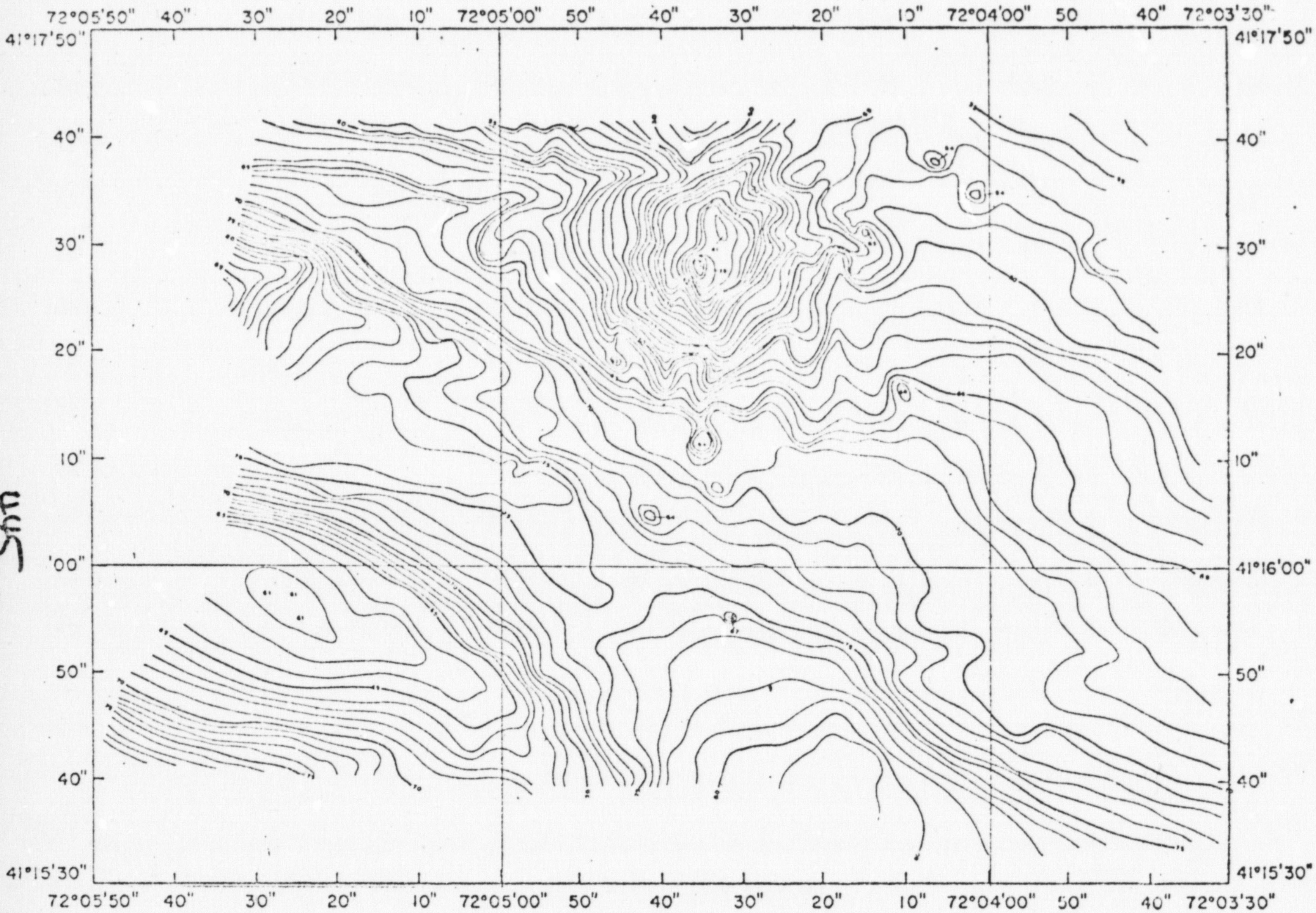

FIGURE 2 BATHYMETRY PHASE 1

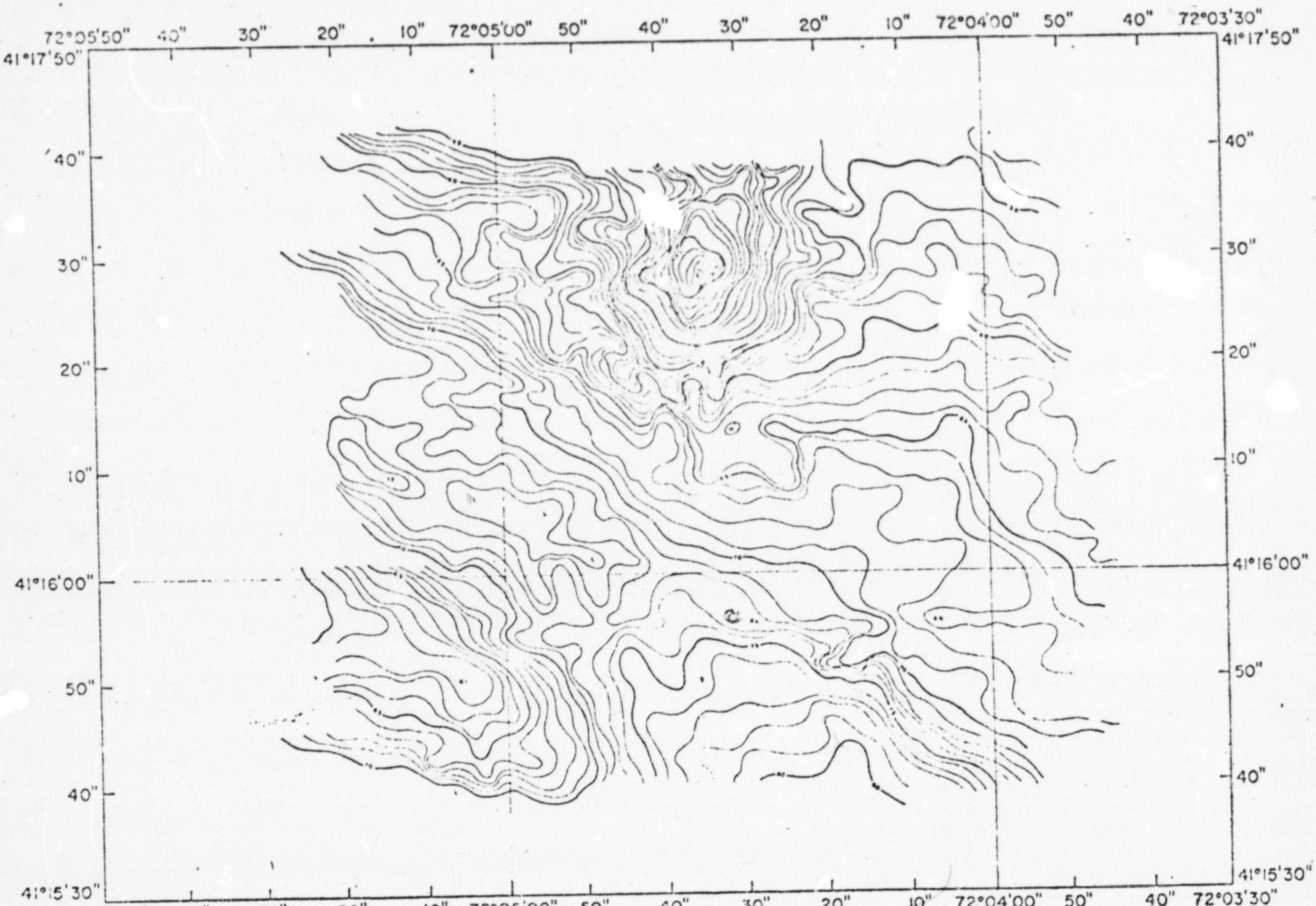

FIGURE 3 BATHYMETRY PHASE 2

NAVOCEANO TECH. NOTE
NO. 7300-3-73

southeast direction through the center of the site; depths in this area have decreased by 2 to 4 feet. Precise determination of the amount and areal extent of the filling caused by the spoil disposal is difficult because of the relatively small amount of material deposited and the inherent inaccuracies in contouring discrete data points.

A total of 92,500 cubic yards of dredge spoil was deposited in the area during the dredging operation. Assuming the disposal site was flat and the material was evenly distributed over the entire area, the change in bottom topography would only amount to 0.07 foot; therefore, unless all the spoil material was deposited in a very small area, measureable changes in bottom topography would be very difficult to detect.

One significant result of the bathymetric surveys was the location and mapping of a previously unidentified shoal area. The surveys revealed a topographic feature with a shoal depth of 36 feet in the north central part of the site, Figure 2, where previously reported depths were greater than 60 feet. This information was passed to the proper authorities and the changes have been made to the National Ocean Survey Chart of the area. Figures 4 and 5 show locations of sampling stations for Phases 1 and 2, respectively.

B. Current Measurements

1. Measurement Techniques - Self contained current meters were installed at four locations in the dredge spoil disposal site to obtain data on the speed and direction of the bottom currents. The data are required to determine the direction of transport of the spoil in suspension and any that may be resuspended by storms, waves, etc. Current measurements were made made with Geodyne A-101 current meters; these instruments utilize a savonious rotor to measure current speed and a vane to measure current direction relative to a magnetic compass. Vane, compass, speed, and in-

clination readings are recorded on 16 mm photographic film. The instruments were pre-set to record for a 50 second period every 10 minutes.

During the period 20 through 25 June 1972, two instruments were bottom mounted at the locations shown in Figure 4, CM1 and CM2. Two additional bottom mounted instruments were installed during the period 2 through 15 August 1972. Because of possible interference with the dredge spoil disposal operation, these two instruments were not installed in the disposal site, but were positioned 1/2 mile north of the northern edge of the site as shown in Figure 4, CM3 and CM4. Pertinent information on the current meters is listed in Table 1.

TABLE I

CURRENT METER INFORMATION

STATION #	METER #	LAT.	LONG.	DATE	WATER DEPTH	METER DEPTH
1	N-15[illegible]	41°16'03"N	72°04'13"W	6/20-25/72	70 Ft.	67 Ft.
2	N-476	41°16'03"N	72°04'58"W	6/20-25/72	70 Ft.	67 Ft.
3	N-323	41°17'05"N	72°03'40"W	8/2-16/72	45 Ft.	42 Ft.
4	N-285	41°17'10"N	72°05'45"W	8/2-16/72	45 Ft.	42 Ft.

2. General Circulation - The disposal site is located in an area where direct current measurements are not sufficient to adequately define the seasonal circulation; however, numerous circulation studies have been made in surrounding areas such as Block Island and Long Island Sound and certain conclusions drawn from these studies can be applied to the circulation in the disposal site.

The general circulation pattern in Long Island and Block Island Sounds is derived primarily from a water balance between a subsurface inflow of saline water and a surface outflow of fresher water through Block

Island Sound near Montauk Point (Riley, 1948). The shoreward movement near the bottom was detected by Bumpus (1965) using sea bed drifters released along the Atlantic Shelf. He found that inside the 50 fathom contour, the bottom flow tends to be westerly or southerly with a component towards the coast and a definite residual flow toward the mouths of the estuaries. Further investigation of the residual near bottom drift in Long Island Sound by Gross and Bumpus (1972), shows that the fresh water discharge of the Connecticut River dominates the residual drift of near bottom waters in the eastern end of Long Island Sound. The net drift speed varied from 0.4 to 1.0 kms/day. A permanent sub-surface drift westward from Rhode Island Sound through Block Island Sound and into Long Island Sound was observed by Cooke (1966). The westward drift was observed during all seasons with a maximum drift rate of 2.8 km/day during spring. The low drift rates determined during these studies indicate that the circulation at the disposal site will be dominated by the tidal currents.

The flood tidal current enters the site through Fisher Island Sound, The Race, and Plum Gut. The northward setting flow through The Race and Plum Gut veer westward and combine with the westward flow from Fisher Island Sound. The ebb tidal current flows from Long Island Sound with a southeasterly set through The Race and Plum Gut and an easterly set through Fisher Island Sound. As expected, the maximum currents are found in the constricted passes at Plum Gut, The Race, and off Watch Hill Point, Rhode Island.

3. Data - The presentation and comparison of the current meter data were complicated because the lengths of the data records obtained from meters N-153, N-476, and N-285 did not agree with the length of the record cal-

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the time scales for these records are not accurate and therefore the individual data records will not be the same length. Because of the varying length of the data records, only the first 25 hours of each record was analyzed. A 25 hour record was chosen to include two semi-diurnal tidal periods.

For each data record, time series of speed, direction, east-west and north-south components are presented. In addition, the data for each record is summarized in two histogram formats; a polar histogram with the coordinates proportional to the strength and direction of the current and a speed bar histogram with a class interval of 5 cm/sec. Average and maximum velocities were calculated for each record.

Bottom current measurements from station 1 and 2 are similar and show strong east-west and north-south components of the current which fluctuate with a semi-diurnal tidal period, Figures 6 thru 11. The east-west component is contributed by the ebb and flood current which sets in and out of Fisher Island Sound. The ebb and flood current through The Race contribure the north-south components. In both records, the time difference between the components is approximately 6 hours with the north component leading the east component. The effect of the phase difference between the components at both stations is to scatter the direction into all the quadrants and to mask the flood and ebb directions.

The strong east-west and north-south components also are present in the current meter records from station 3 and 4, Figures 12 thru 17. A 4 hour phase difference between the components with the north component leading the east component produced a current at station 3 with a rotary (counter-clockwise) tendency, Figure 12. At station 4, the north component is in phase with the east component resulting in an overall current with a

clearly defined ebb and flood direction paralleling the coastline at 050°T and 250°T, respectively, Figure 16.

The time series data and histograms for current station 1, 2, 3, and 4 are presented in Figures 6 through 17. A summary of the average and maximum velocities observed are listed in Table 2.

TABLE 2

AVERAGE AND MAXIMUM CURRENT VELOCITIES

Station	Average Velocity		Maximum Velocity	
	Speed	Direction	Speed	Direction
1	4.2 cm/sec	003°T	30.8 cm/sec	115°T
2	3.0 cm/sec	345°T	33.4 cm/sec	110°T
3	4.47 cm/sec	224°T	33.4 cm/sec	110°T
4	3.48 cm/sec	309°T	38.6 cm/sec	090°T

4. Summary - The circulation in the disposal site is primarily a semi-diurnal tidal current. The flood and ebb currents enter the site from two directions: east-west through Fisher Island Sound and northeast and south-west through The Race. The phase relationship between the two waves determine the dominant direction, if any, of the current. Maximum observed speeds did not exceed 38.6 cm/sec and the range of the average speed is 3.0 cm/sec to 4.47 cm/sec. The current speeds and directions measured during these investigations indicate that any re-suspended sediments probably would remain in the general vicinity of the disposal site. These conclusions are based on relatively short data records and may not represent the conditions occurring over a long period of time.

* * *

study area of one square mile. To the extent that seven samples may be representative of such a variable situation, the average oil and grease concentration for the disposal site as a whole approached the maximum permissible level set by EPA.

In Phase 2 (Figure 5), baseline values were obtained in the trough within the site at Station 6 (773 ppm) and just south of the site at Station 12 (573 ppm). Two stations exceeded the EPA criterion in Phase 2, Station 5 with 2880 ppm and Station 11 with 2370 ppm. These stations are located on opposite shoulders of the relict mound in the southwest corner of the site. These values compare with the value 2709 ppm observed at the same general location in Phase 1 (Station 13). Further, similarity among these station from both surveys is observed for percent volatiles and BOD (Table 12). The remaining stations show values well within the EPA criterion, ranging from 838 ppm to 1059 ppm. The average value of the six samples taken within the site during Phase 2 is 1290 ppm. The oil and grease concentrations observed during Phase 2 are slightly lower than those in Phase 1, possibly because one localized area with high oil and grease content (the larger relict mound in the north-central area of the site) was not sampled during Phase 2.

The results of oil and grease analyses from the two surveys suggest the following:

1. Environmental baseline concentrations of oil and grease are found in the trough which separates the two relict mounds of spoil within the dump site. If contaminated sediment has been dumped or has slumped into the trough in the past, it has been scoured out by bottom currents, tides, and/or storms.

2. In at least two locations in the site, spoil from past disposal operations which was contaminated by oil and grease (with respect to EPA's criterion) has persisted in spite of tidal current action and at least one hurricane.

3. No significant change was observed in oil and grease concentration as a result of the spoil disposal.

7. BENTHIC BIOLOGY

a. Sampling Procedure

Pre- and post-disposal examinations of the benthic macrofaunal communities at the disposal site were carried out to assess the effects of dredge spoil on the benthic biota. Additionally bottom sediments were subjected to bacteriological analyses, to determine if any changes in total and fecal coliforms were caused by the dredge spoil. The biological oxygen demand (BOD) of the sediments also was determined.

During Phase 1, a total of 27 bottom sediment samples were collected at 9 sampling locations shown in Figure 21. Three samples were collected at each location: one for analyses of benthic invertebrates, one for geochemical properties, and one for bacteriology and BOD. An additional set of three grab samples were collected at Station 9, one nautical mile to the northeast of the disposal site.

The Phase 1 investigation showed a wide variability in the invertebrate population in the bottom samples, indicating that a greater number of samples should be collected at each station to achieve statistically meaningful results. A larger number of samples collected at fewer stations, would provide more confidence to the assessment of possible changes in the benthic biota of the disposal area; therefore, during Phase 2, six bottom samples

VI. CONCLUSIONS

Preliminary analysis of the environmental data collected during Phase I and 2 of the spoil disposal site investigation shows the following:

1. The dredge spoil deposition resulted in some minor changes in the bathymetry at the site, primarily in the depression which runs northwest-southeast through the center of the site.

2. The bathymetry is significantly different from that shown on previous charts of the area, especially in the northern sector of the site. In this region a water depth of 36 feet was recorded where previously reported depths were in excess of 60 feet. It is not suggested that this discrepancy in depth is caused by the presently addressed spoil disposal.

3. Circulation at the site is primarily a semi-diurnal tidal current. Current direction and speed recorded during the investigation indicate that resuspended sediment would undergo limited net transport and probably would remain in the general vicinity of the disposal site.

4. Differences in the physical and chemical properties of the water mass between Phase I and 2 are related primarily to seasonal effects and to the effects of the abnormal stream discharge entering the site during Phase I.

5. Deposition of the dredged wastes did not significantly affect the distribution of trace metals in the water column. Mercury and cadmium showed no significant variations with depth during Phase I or 2. Lead increased with depth during both phases, and the bottom sediments may serve as its source. Zinc and copper showed no significant vertical variations in Phase I, but did in Phase 2 where they were more abundant in the surface waters. Their most probable source is runoff.

6. The mean ($\overline{X}$) grain size of the sediments in the disposal area decreased between Phase I and 2 from 0.0731 mm to 0.0563. Statistically, this difference is not significant.

7. The $\overline{X}$ (% wgt) organic carbon of the sediments decreased between Phase I and 2 from 1.56 to 0.98. This 40% reduction most likely is a consequence of the deposition of relatively sterile, biologically speaking, sediments on top of sediments in the disposal site whose biota content is relatively higher. Statistically, however, the difference is not significant.

8. The $\overline{X}$ (% wgt) Kjeldahl nitrogen of the sediments did not change between Phase I and 2; 0.145 and 0.146, respectively. These values are an order of magnitude greater than average oceanic values.

9. The $\overline{X}$ of the concentration (ppm) of Pb, Zn, Cu and Cd increased between Phase I and 2; Zn was nearly 2 times greater, and Pb half again greater. Copper and Cd increased very little. Despite the apparently large increases in Zn and Pb, the differences are not statistically significant which is partly a result of the large sample variation. We conclude then that on the basis of heavy metal concentrations, in the sediments, one cannot differentiate Phase I from Phase 2. Mercury was not detected.

10. The $\overline{X}$ (% wgt) volatile solids of the sediments increased between Phase I and 2 from 3.83 to 4.43; however, this difference is not significant. Only one of the Phase I samples and two of the Phase 2 samples are in excess of EPA's guideline criteria (6%).

11. Two stations (13 and 14) from Phase I exceeded EPA's criterion for oil and grease of 1500 ppm; the values are 2709 and 2148, respectively. Two

stations (5 and 11) exceed the EPA limits in Phase 2, 2880 and 2370, respectively. All four of these stations are on the flanks of a relic mound in the southwest corner of the disposal site. On the basis of the oil and grease analyses, there has been no adverse effect of dumping the dredge spoils. The relic mound mentioned above appears to have resulted from past dumping of various spoils in that area.

12. The extremely low incidence of total and fecal coliform, with no increases noted subsequent to the current spoil disposal operations, indicates that no adverse bacteriological (coliform) effects have occurred as a result of the current dumping.

13. The BOD of sediments of the dumping area appear not to be adversely affected by the current dumping. All values were 3.5 or less with the exception of higher values observed in the southwest corner of the disposal area, both before and after the current dumping.

14. As would be expected, the current dumping has resulted in an initial reduction in total numbers of bottom dwelling animals and the numbers of kinds of bottom dwelling animals per unit area. Post-dump faunal densities are approximately half those observed prior to dumping. These results largely from burial, suffocation by sediments and anoxia, as well as increased turbidity. A number of animals readily burrow to the surface, including certain polychaeles and mollusles. Re-establishment of the benthic community should readily occur through faunal migration and fresh larval sets, unless organisms are excluded from the area by the residual affects of toxic substances. This will be examined in the June 1973 study.

In summary, the data indicate only minor changes in the environment which might be attributed to the present spoil disposal. The results

of the investigation are indicative only of the environmental changes which occurred immediately after the completion of the spoil disposal operation. Any longer term changes in the environment will be examined during Phase 3 of the investigation which is scheduled for June 1973, approximately seven months after completion of the spoil disposal.

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PIff EXHIBIT 7B
CASE NO. H 74-268 TYPE Civil
FULL EXHIBIT X

ARTMENT OF THE ARMY
.AND DIVISION. CORPS OF ENGINEERS
424 TRAPELO ROAD
THAM, MASSACHUSETTS 02154

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Exh. 7B

SEP 1 1 1974

2 May 1973

FOR IDENTIFICATION ☐
U.S. DISTRICT COURT
DISTRICT OF CONN.

Disposal of Dredged Material

Commanding Officer
Northern Division
Naval Facilities Engineering Command
U.S. Naval Base
Philadelphia, Pennsylvania 19112

1. We have received your teletype request dated 24 April 1973 to amend your permit application for dredging in the Thames River to include disposal of spoil material at the dump site commonly known as the Brenton Reef Dump.

2. We cannot comply with your request until several outstanding questions are resolved which have a direct bearing on the most suitable location for disposal.

a. The Environmental Protection Agency has not yet issued its criteria for ocean disposal under the Marine Protection, Research, and Sanctuaries Act of 1972.

b. We are still awaiting the results of monitoring studies of the New London Dump in conjunction with your disposal of dredged material from the vicinity of the submarine pens.

c. The Brenton Reef Dump is already designated as the disposal site for several proposed public dredging projects in Rhode Island and Massachusetts. The additional quantity of material from the Thames River may be an overloading factor.

d. The State of Rhode Island has no legal jurisdiction to deny the Navy dumping. However, it has a great interest in the quality of the waters off Rhode Island and exercises State jurisdiction of private and other public dredging projects. Its views on the matter should be given full consideration.

NEDOD-P 2 May 1973
SUBJECT: Request for Disposal of Dredged Material

3. When these questions have been resolved, the views of the U.S. Environmental Protection Agency and the U.S. Fish and Wildlife Service must be sought and given full consideration. As you can see, it is quite premature to specify any particular dump site as being most suitable for your project.

4. Several months ago we suggested that informal coordination with the Corps before issuing the Environmental Impact Statement would be helpful. It would answer the obvious first question from any opponent, "Has the dump site been cleared with the Corps and EPA under requirements of the Ocean Dumping Act?" Without first seeing your consultant's reasoning in selecting Brenton Reef; it is impossible for us to make a commitment. Since the dump site you propose is a great distance from the project, it seems to us that the added transportation cost becomes a significant factor to be weighed against environmental impacts. I would be happy to make my staff available to review the Environmental Impact Statement with you prior to its release. In this way, we can avoid any public adversary situation that may arise. It would also reduce formal Corps comments thereby saving time and effort in the formal coordination phase.

5. We wish to do all we can to expedite the permit process and hope to hear from you soon.

CHARLES J. OSTERNDORF
Colonel, Corps of Engineers
Acting Division Engineer

Exh. 9

Navy EIS on Thames River Dredging

NEDOD

Division Engineer

Chief, Operations Div 23 Jan 1974
Mr. Andreliunas/mep/320

1. Final EIS by the Navy has been submitted to CEQ. It contains some misinformation which has been the subject of numerous phone inquiries from the press and from Congressman Steele's office.

2. The EIS states that the Scientific Advisory Subcommittee recommended the New London Dumping Ground. That statement is false and we advised the Navy of it during our review of the previous draft. In fact, the use of the New London Dumping Ground was a recommendation which we presented to the Scientific Advisory Subcommittee for comment and recommendations. The Subcommittee's views were that if the project had to proceed, the New London Dumping Ground was a reasonable choice providing that adequate studies were conducted which would provide for safeguards and for determination of alternate areas should they be needed. The Scientific Advisory Subcommittee also agreed to review study proposals and have made significant recommendations on proposals written to date.

3. The EIS apparently has given the impression with its issuance that the use of New London Dumping Ground and the dredging project will proceed imminently. We have been consistently reporting that a permit has not been issued and that the final decision would be made in Washington based upon all relevant factors, including our report to them. This decision cannot be final until at least 30 days after the date of filing the EIS with CEQ.

ANDRELIUNAS

CF:
Public Affairs Ofcr
Mr. Leslie
Construction Div
Mr. Rees - Permits Br
Opers Div File

Exhibit 12

NAVAL OCEANOGRAPHIC OFFICE
WASHINGTON, D. C. 20373

FINAL REPORT
ENVIRONMENTAL INVESTIGATION OF A DREDGE SPOIL DISPOSAL SITE NEAR NEW LONDON, CONNECTICUT

by

Physical Oceanography Division

December 1973

ABSTRACT

The U.S. Naval Oceanographic Office conducted a multi-phase environmental monitoring program of a dredge spoil disposal site off New London, Connecticut. The monitoring program was conducted in three phases; Phase 1 in June 1972, Phase 2 in November 1972, and Phase 3 in May 1973. The measurement suite consisted of physical properties of the water, nutrients, bathymetry, currents, and selected heavy metals in sediments. Studies to determine the effect of the disposals on benthic fauna were also conducted. Minor changes in bathymetry were noted. Deposition of dredged waste did not significantly change levels of heavy metals in water or sediment. The current dumping resulted in an initial reduction in total numbers of benthic fauna and number and kinds organisms per unit area.

DRAFT

I. INTRODUCTION

In May 1972, the Naval Oceanographic Office was requested by the Northern Division of the Naval Facilities Engineering Command (NORTH-NAVFACENGCOM), to conduct an environmental investigation of a dredge spoil disposal site located near the mouth of the Thames River at New London, Connecticut. The investigation was one of the requirements imposed on the Navy by the Environmental Protection Agency (EPA) before a permit would be issued for disposal of dredge spoil at the site. The permit was required by the Navy to dispose of spoil dredged from a pier construction site at the Navy Submarine Base in Groton, Connecticut.

The investigation was divided into three phases: Phase 1 was conducted in June 1972 prior to the disposal of dredge spoil at the site; Phase 2 was conducted in October and November, 1972 immediately after completion of the spoil disposal; and Phase 3 was conducted in May 1973 approximately 7 months after the completion of the disposal operation. During each phase, a detailed bathymetric survey of the site was made; water samples were collected and analyzed for salinity, temperature, dissolved oxygen content, nutrients, and heavy metals; bottom sediment samples were collected and analyzed for carbonate content, heavy metals, volatile solids, oil and grease; bottom sediments samples also were examined to determine population densities of benthic fauna, and underwater light transmission measurements were made. Additionally during Phase 1, bottom current measurements were made to determine the circulation pattern at the site. Analysis of the data collected during all three phases has been completed and comparisons made to assess the effects of the dredge spoil on the marine environment at the disposal site.

Dredging at the construction site commenced on 17 July 1972 and was completed on 8 October 1972. During this period, a total of 92,000 cubic yards of material was dredged and transported to the disposal site at an average rate of about 1500 to 1800 cubic yards per day.

II. PHYSICAL CHARACTERISTICS OF THE ENVIRONMENT

A. Locale - The site used for the disposal of the dredge spoil from the Navy Submarine Base is located in Fishers Island Sound about two miles south of the entrance to the Thames River. The site covers an area approximately one mile square bounded by 41°15'N to 41°16'N latitude and 72°03'58"W to 72°05'18"W longitude, Figure 1.

B. Bathymetry - A detailed bathymetric survey of the site was made during all three phases of the investigation to determine if the deposition of the dredge spoil had caused any significant change in bottom topography.

The bathymetric depth soundings were made with a 21 kHz acoustic transducer mounted on the side of the survey vessel. The acoustic signals were recorded with a Raytheon Model 723 Recorder. Accuracy of the depth sounding system is ±0.25 feet at 1 to 100 feet. The position of the survey vessel was determined with a Cubic Autotape Model DM-40 navigation system which has an accuracy of ±1 meter. During each survey, a series of 26 parallel east-west sounding lines, spaced approximately 70 yards apart, were run at a speed of 5 knots. Additionally, three to five north-south transects were run for control purposes. Ships position was recorded at one-minute intervals along all of the track lines.

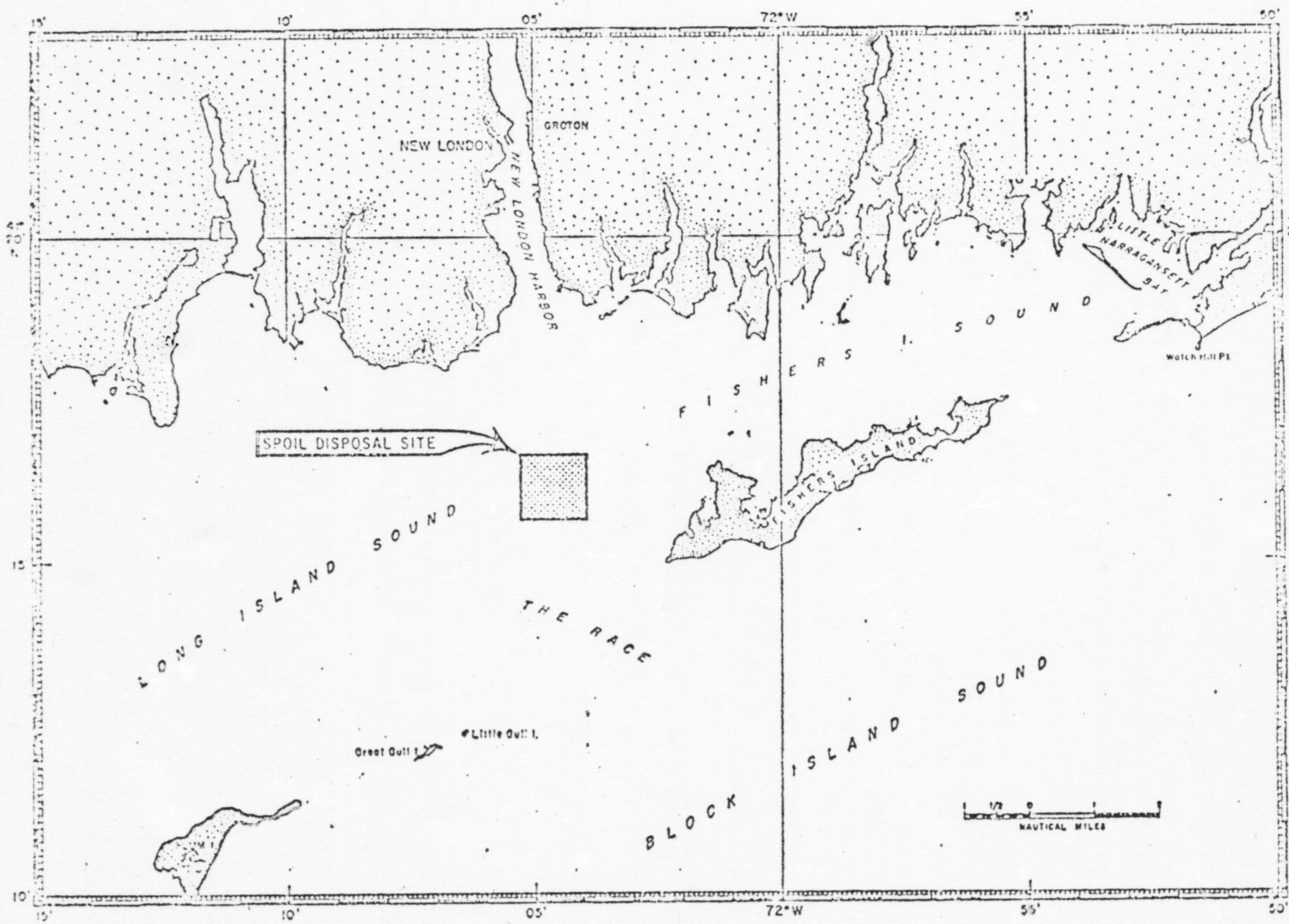

FIGURE 1. DREDGE SPOIL DISPOSAL SITE

The data were plotted and contoured at one foot intervals to produce the bathymetric charts shown in Figures 2, 3, and 4. Comparison of the charts indicates some changes in the bathymetry which may be attributed to the dredge spoil deposition, especially in the north-central section of the disposal site. Greatest changes in the bathymetry occur in the depression which runs in a northwest-southeast direction through the center of the site; depths in this area have decreased by 2 to 4 feet. Precise determination of the amount and areal extent of the filling caused by the spoil disposal is difficult because of the relatively small amount of material deposited and the inherent inaccuracies in plotting and contouring discrete data points.

A total of 92,000 cubic yards of dredge spoil was deposited in the area during the dredging operation. Assuming the disposal site was flat and the material was evenly distributed over the entire area, the change in bottom topography would only amount to 0.07 foot; therefore, unless all the spoil material was deposited in a very small area, measureable changes in bottom topography would be very difficult to detect.

One significant result of the bathymetric surveys was the location and charting of a previously unidentified shoal area. The surveys revealed a topographic feature with a shoal depth of 36 feet in the north central part of the site, Figure 2, where previously reported depths were greater than 60 feet. This information was forwarded to the proper authorities and the appropriate changes were made to the National Ocean Survey Charts of the area.

C. Sampling Stations - Locations of the sampling stations for Phases 1, 2, and 3 are shown in Figures 5, 6, and 7, respectively. The type and numbers of samples collected at each station are also indicated in the figures.

TABLE 2

AVERAGE AND MAXIMUM CURRENT VELOCITIES

Station	Average Velocity		Maximum Velocity	
	Speed	Direction	Speed	Direction
1	4.2 cm/sec	003°T	30.8 cm/sec	115°T
2	3.0 cm/sec	345°T	33.4 cm/sec	110°T
3	4.47 cm/sec	224°T	33.4 cm/sec	110°T
4	3.48 cm/sec	309°T	38.6 cm/sec	090°T

4. Summary - The circulation in the disposal site is primarily a semi-diurnal tidal current. The flood and ebb currents enter the site from two directions: east-west through Fisher Island Sound and northeast and southwest through The Race. The phase relationship between the two waves determine the dominant direction, if any, of the current. Maximum observed speeds did not exceed 38.6 cm/sec and the range of the average speed is 3.0 cm/sec to 4.47 cm/sec. The current speeds and directions measured during these investigations indicate that any re-suspended sediments probably would remain in the general vicinity of the disposal site. These conclusions are based on relatively short data records and may not represent the conditions occurring over a long period of time.

E. Optical Properties

The total suspended particulates in the water samples were determined for all three phases in conjunction with light transmission measurements. The latter were made with a transmissometer developed by the Visibility Laboratory of the Scripps Institution of Oceanography. The transmissometer determines the amount of image-forming light transmitted per

* * *

high oil and grease values tend to be found in fine muds, and low values tend to be found in sands. Plotting oil and grease values against mean particle diameter for all three phases show this relationship was so (Figure 20). In spite of considerable scatter the trend is evident, and the graph suggests a curvilinear relation. However, the relation lacks statistical validity. Ranking the data in Figure 20 according to oil and grease and grouping by thirds, the mean particle diameter increased from 0.046 mm for the upper third of oil and grease values to 0.056 mm for the bottom third. However, these differences were not statistically significant; further, there was no clumping of data points for any phase with respect to either oil and grease or grain size that would reveal any influence of spoil. Exclusion of selected data points on a rational basis, such as oil and grease values with a coefficient of variation of less than 5% or 33% probability of occurance, failed to improve statistical validity of the relationship.

The results of oil and grease reflect the dominance of tides and storms on the levels of contaminations present in dredge spoil. Although deposited spoil was evidently removed from the site by scouring, it is uncertain whether it was carried landward, into central Long Island Sound, or out to sea. As was discussed in Section II-C, resuspension under normal conditions would tend landward; however, the normal tidal currents presented in Section II-B are not likely to resuspend significant amounts of spoil which tend to be fine and cohesive. Therefore, the data suggest that, with respect to oil and grease, the bottom sediments will reflect

the concentration of only the most recent deposition rather than the steady buildup in concentration.

VI. CONCLUSIONS

Analysis of the environmental data collected during the spoil disposal site investigation shows the following:

1. The dredge spoil deposition resulted in some minor changes in the bathymetry at the site, primarily in the depression which runs northwest-southeast through the center of the site.

2. The bathymetry is significiantly different from that shown on previous charts of the area, especially in the northern sector of the site. In this region a water depth of 36 feet was recorded where previously reported depths were in excess of 60 feet. It is not suggested that this discrepancy in depth is caused by the presently addressed spoil disposal.

3. Circulation at the site is primarily a semi-diurnal tidal current. Current direction and speed recorded during the investigation indicate that resuspended sediment would undergo limited net transport and probably would remain in the general vicinity of the disposal site.

4. Differences in the physical and chenical properties of the water mases between Phases 1, 2, and 3 are related primarily to seasonal effects and to the effects of the abnormal stream discharge entering the site during Phase 1. Also, as observed by other workers, nitrate is the limiting nutrient.

5. Deposition of the dredged wastes did not significantly affect the distribution of trace metals in the water column. Mercury and cadmium showed no significant variations with depth during Phases 1, 2 and 3. Lead increased with depth during all phases,

and the bottom sediments may serve as its source. Zinc and copper showed no significant vertical variations in Phase 1, but did in Phase 2 where they were more abundant in the surface waters. Their most probable source is runoff. In Phase 3 copper showed no worked vertical variation until zinc had a negative gradient.

6. Statistically ($P_{0.05}$), the meams of the grain size of the bottom sediments in the disposal site for the three Phases are not different despite the fact that a few individual stations appear to be different as pointed out im the discussion of the biology of the site. On the basis of our data, the presence or absence of spoil material in the disposal site cannot be detected.

The same holds true for the carbonate content, total organic Carbon and Kjeldahl nitrogen, i.e., the presence or absence of spoil material in the disposal site canmot be detected as there are no significant ($P_{0.05}$) differences between these properties for all three Phases.

7. With exception of Cu, the heavy metal (Pb, Zn, Cd, Hg) concentrations in the bottom sediments are not significantly ($P_{0.05}$) different between any two Phases. The large variances between samples and the interdependence of the heavy metals results in significant complexity in the system which masks any differences that might be present. The only solution to this problem is to analyze several more samples and to do them in replicates. The system will ultimately come under control with such an approach and statements about differences can be made with greater confidence. The presence or absence of spoil material in the disposal

site cannot be determined on the basis of the heavy metals (except Cu) concentrations in the bottom sediments. The mean Cu concentrations do vary significantly between Phases 2 & 3 ($P_{0.01}$) and between Phases 1 & 3 ($P_{0.05}$); however, a significant difference in Cu would be expected between Phases 1 & 2, i.e., right after the spoil is dumped at the disposal site, but none was noted. Either there is a source of Cu unrelated to the spoil material or it is a case where the 1 in 1000 (Phases 2 vs 3) or 5 in 100 (Phases 1 vs 3) chance occurred that a significant difference was observed when it actually is not real.

One cannot, on the basis of these samples and analyses, support and claim that the disposal site has been adversely affected by the spoil disposal. The results and conclusions of the biology of the area, ironically, suggest that not only has the site recovered but that larger numbers of bottom dwellers were present during Phase 3 than during Phase 1.

8. Prior to spoil disposal, the bottom sediments were patchy in texture and oil and grease content. Oil and grease content ranged from low background levels to contaiminated levels. Overall, the pre-existing sediments approached the EPA criterion, averaging 1441 ppm.

9. After the disposal (Phase 2), texture and oil and grease levels varied at individual stations, but distribution was patchy as in Phase 1. Overall the oil and grease content of the spoil was not statistically different from pre-disposal conditions, averaging 1259 ppm; however, this figure refers only to the material after deposition and not as it was released in suspension from the dredge.

10. During the winter intervening between Phase 2 and Phase 3, deposited spoil was scoured from the dump site by tides and storms resulting in a 45% decline in oil and grease concentration to a near-background level of 739 ppm.

11. Bacteriological examinations show an extremely low incidence of fecal and total coliforms, with no increases observed subsequent to the spoil disposal.

12. Due to the lack of a broadly accepted methodology for determining the biochemical oxygen demand of sediments, it is difficult to interpret the BOD values obtained in the present investigation. Never-the-less, observed BOD of sediments of the disposal area were not appreciably altered by the spoil disposal. All 5 days values were 3,5 mg O_2/L/g or less, with the exception of somewhat higher values which were observed in the southwest corner of the disposal area both before and after spoil disposal.

13. The Phase 1 (June 1972) survey showed that the predominant invertebrates of the disposal site and immediate vicinity are tube dwelling ampeliscid amphipods. They are particularly abundant in the silty sand sediments which are predominant over much of the disposal area except in the southwest corner where a higher clay-silt fraction and a greater abundance of polychaetes occur.

14. The Phase 2 (November 1972) study showed a severe initial impairment of the benthic communities at the disposal site with near total elimination of major taxa at directly affected stations. However, the Phase 3 (June 1973) monitoring showed that an exceedingly rapid recovery occurred in the 8 month period following the cessation of spoil disposal with faunal densities returning at most stations to levels in excess of those observed during the

Phase 1 (June 1972). The predominant recolonizers were the Ampelisidae. The extremely rapid and extensive recolonization may be attributable to the opportunistic colonizing nature of the ampeliscids, a favorable alteration in sediment size, and most importantly, the nonoccurrence of sufficient toxic substances in the new bottom material adversely effect the newly established community.

Exhibit 13

UNITED STATES DISTRICT COURT
DISTRICT OF CONNECTICUT

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NATURAL RESOURCES DEFENSE COUNCIL, INC., et al., :

Plaintiffs, :

-against- :

HOWARD H. CALLAWAY, as Secretary of the Army, et al., :

Defendants. :

---------------------------------------x

STATE OF NEW YORK)
: ss.:
COUNTY OF SUFFOLK)

W. FRANK BOHLEN, being duly sworn, deposes and says:

1. This affidavit is submitted at the request of the plaintiffs in this action, in support of their motion for a preliminary injunction to restrain the Navy from dumping 2.8 million cubic yards of polluted spoil dredged from the Thames River into Long Island Sound offshore of New London and Fishers Island. Having spent more than five years studying the currents in the Sound and their ability to transport dredged spoil, I am convinced that the Navy has improperly assessed the potential dangers of the dumping and has exposed the coastal resources of the area to serious and needless risks that could be substantially reduced by relocation of the dumping area to a site further offshore and in deeper waters.

Qualifications

2. My qualifications are as follows: I am currently Assistant Professor of Oceanography at the Marine Sciences Institute, University of Connecticut, Avery Point in Groton, Connecticut. I have served in this capacity since 1969 and, in addition to teaching, have spent a large portion of my tine studying sediment transport in Long Island Sound, including, in particular, sediment transport in and around dredged spoil sites. Included among these is the New London Dumping Grounds proposed for use in this case, which I and my colleagues have had frequent occasion to study since 1971.

3. In terms of background, I graduated from Notre Dame University in 1960 with a B.A. in Engineering Physics and received my Doctorate in Physical Oceanography from Massachusetts Institute of Technology in 1969. After leaving Notre Dame, I was in the Navy for two years, and then, in 1962 and 1963, worked as a Research Assistant at the Woods Hole Oceanographic Institute, following which I worked for a year and a half as an engineer. In 1964 I returned to Woods Hole, for a year (including a trip to the Indian Ocean) and thereafter served as a Research Assistant at MIT until 1969 when I received my Ph.D. Since that time, I have been at the Marine Sciences Institute. Without going into detail, I have published a number of research papers and other works, including two studies on sediment transport in coastal waters and two reports to the Army Corps of Engineers

on dredged spoil disposal in coastal areas. Since 1972, I have been a member of two committees concerned with coastal ecology, the New England River Basin Commission's Research and Planning Committee for the Study of Long Island Sound, and the Town of Groton Conservation Committee.

4. Because of my research activities and committee appointments, I am fully familiar with both the plans of the Navy to dump spoil in the Sound at New London, and the nature and characteristics of the spoil and the dump site itself. As already indicated, I have done a great deal of research on dredged spoil transport in Long Island Sound, including in the area of the dump site, and have thus come to know the physical parameters of the dumping area, the nature of the currents there, and the susceptibility of spoil to movement. In addition, as a member of the Groton Conservation Committee, I have carefully studied both the draft and final impact statements filed by the Navy in conjunction with the dredging/dumping project.

The Nature of the Proposal and the Problems

5. The proposal involved here, which is already underway, is to dredge some 2,800,000 cubic yards of sediment from the bottom of the Thames River, and then dump these approximately one and a half miles offshore at a site which is called the New London Dumping Ground. The spoils themselves are admittedly polluted, exceeding in a number of respects the criteria for

permissible dumping materials established by the Environmental Protection Agency. They contain, among other things, heavy metal elements, oil residues, volatile solids, fecal coliforms and a number of other bacteria or viruses associated with human wastes, none of which are healthy for marine life.

6. Given the polluted nature of the spoils, the Army and Navy recognized, quite properly in my judgment, that if the sediments were to be disposed of in ocean waters, they should be dumped in an area where they would not be dispersed over a wide area, but, to the extent feasible, would be contained where they were dumped. This was a primary conclusion of the Revised Draft Environmental Impact Statement, and on this basis a proven containment site off of Rhode Island was selected as the recommended location. However, in July 1973, the Rhode Island site was suddenly dropped -- and in its stead, the New London Dumping Ground was chosen, purportedly on the grounds that it too was a containment site. In my opinion, however, based on my familiarity with the site and my studies of sediment transport, this clearly is not the case.

7. To be specific, the New London Dumping Ground lies in a relatively shallow basin, with a minimum depth of 35 feet and a maximum of only about 80 feet. This shallow bottom is washed continuously by currents, oscilating generally with the tide, but having a net transport to the northwest into the Sound. The

currents are of sufficient velocity that, given the shallow physical configuration of the site, dispersal of silt and sediments would normally be expected.

8. The Navy and the Corps, however, based on limited tests made in 1972, has claimed that some 97,000 cubic yards of spoil dumped at the site at that time did not move and, holding this up as proof, assert that New London is a containment site. But this is to ignore, in addition to the physical configuration, two critical facts. In the first instance, the Navy's studies were limited to calm weather in July and August, when high energy currents are absent. By contrast, in stormy conditions which characterize the fall and winter, the currents will be much greater, and sediment transport under these conditions is, in my opinion, probable even in the early years.

9. The second and even more critical factor ignored by the Navy and the Corps is that when dredged spoils are originally dumped, they are highly compacted and in many respects more like rock than mud. For this reason, dispersal seldom occurs, whatever the currents, in the months immediately following the dump. Thus it could hardly have been expected that the Navy studies made in 1972 would show movement. In time, however, the dredged spoils are broken down as they are populated with burrowing bottom creatures; and it is at this point, often after a year or more, that dispersal begins. In the case of the New London

site, this is exactly what I believe will occur. In the first year there may be little movement, even in stormy conditions; but as time extends, given the shallowness of the site and the currents measured there, it is my opinion that there will be wide-spread dispersal even in regular currents.

10. The consequences of dispersal of the polluted sediment cannot be predicted precisely, and there is always the chance that the impacts would be modest. However, the serious risks simply cannot be denied -- namely, the risk of long-term and serious damage to the rich marine resources, including shellfish and finfish, that inhabit the site and the surrounding coastal areas.

11. The risks involved here are particularly serious for two reasons. The first of these is the sheer mass of polluted spoil that will be discharged -- 2,800,000 cubic yards which is equivalent to a slab 300 feet wide, a mile long and 50 feet in height. As indicated, it is likely that this material will not disperse greatly within the first year or so. But once the dispersal begins, it will have massive amounts of spoil to feed it and thus could spread over miles and miles of the Sound, carrying the pollutants with it and exposing an extremely large number of fish, shellfish and other marine

organisms to them. And at this point, of course, there will be no way to stop it.

12. The second factor which makes the risks so serious is the proximity of the site to what can only be described as a rich coastal fishery. This includes, in the first instance, shellfish, such as lobsters, clams and mussels, that dwell in and around the site itself, and a variety of finfish that populate this general area of the Sound. But beyond the immediate inhabitants, there lies only a mile and a half away -- and in the direction that the sediments would be expected to be carried -- the spawning and nursery areas of the Connecticut coast. These areas are, of course, critical not merely to the health and survival of local populations, but, as a result of migration, to far broader reaches of the Sound and even the outlying ocean. Thus, any serious risk of damage should, in my opinion, be avoided if at all possible.

13. That has not been done here. In my judgment, there can be no question that in time, the polluted sediments dumped at New London will be dispersed over a far borader area, moving along the bottom and in some instances becoming suspended in the water column. This, in turn, will pose particular dangers to the many benthic (or bottom dwelling and feeding) species found in the surrounding waters, including lobster and

flounder, and also to the filter-feeding shellfish. The ingestion of the polluted elements, either directly or through the steps of the food chain, could well lead to increased disease in such organisms; and the large-scale intrusion of the spoils into the nearby coastal areas could have a major adverse impact on the continued viability of life there. All of this, admittedly, cannot be shown as inevitable. But to take such risks with so much spoil involved and in an area so near to the shore makes little sense unless there are simply no alternatives.

14. Such is not the case here. Better alternative sites do exist. Specifically, the Navy and the Corps, at one time or another, have themselves identified and/or suggested (A) a location 10 miles southeast of Block Island, and (B) two others south and east of Fishers Island. Each of these sites is quite deep, and each appears to meet the criteria of a containment site. By contrast, the New London Dumping Ground clearly is not a containment site.

15. The additional virtue of these alternative sites lies in their location farther from important coastal areas than the New London site, and in the theory of dilution by distance. Thus, while, because of containment characteristics, the polluted spoils are unlikely to move from these sites, even if they should, the sites are so much more remote from the

coast that the spoil would have far greater opportunity to dissipate before reaching coastal resources, marine fisheries and the like. This, in turn, would mean less of an impact upon important nursery and spawning grounds, and thus less risk to the life supported in these areas, than is the case with the New London site. In short, by abandoning the New London Dumping Ground, and choosing a true containment site further removed from coastal areas, we can greatly increase the odds of protecting the environment, and greatly reduce the risks being taken now.

16. Given that there are better, lower-risk sites available, it is, in my opinion, unreasonable to gamble by dumping polluted spoils at New London only a mile and a half away from coastal nursery and spawning grounds. In this connection, I should also emphasize that the monitoring program proposed by the Navy here offers little, if any, protection against the risks. This is the case in the first instance because the monitoring is directed to short-term impacts only, and will leave long-term effects undetected. But beyond this, even if the monitoring were long-term, it would probably be of little assistance. This conclusion follows because, as I have already indicated, movement of the polluted spoil is unlikely for a year or more. But once it began, with a million and a half or more cubic yards already on the bottom, the sudden revelation that movement was occurring would allow for no cure. In

short, once the material was down there, it is highly unlikely that corrective action could be taken; instead, the monitoring will, I fear, simply be a witness to the damage, not a means of preventing it.

Conclusion

17. In summary, it is my opinion that the New London Dumping Ground is not a containment site; that the polluted spoils deposited there will, with time, be dispersed over a wide area; and that the resulting risks to the marine resources of the coast and of Eastern Long Island Sound will be serious indeed. It is further my opinion that these risks are being taken needlessly, in that they can be significantly reduced by moving the dumping operation to a proven containment site or a deeper location further offshore. Finally, it is my opinion that the Navy and the Corps, after establishing the proper standard in seeking a containment site, completely departed from that standard -- for reasons political perhaps, but in no respect environmental -- when they selected the New London Dumping Ground.

W. Frank Bohlen
W. FRANK BOHLEN

Sworn to before me this
26th day of August, 1974.

Lucy J. Ahman
Notary Public
Notary Public, State of New York
No. 52-0023550
Qualified in Suffolk County
Term expires March 30, 1975

Exhibit 14

UNITED STATES DISTRICT COURT
DISTRICT OF CONNECTICUT

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NATURAL RESOURCES DEFENSE COUNCIL, INC., et al., :

Plaintiffs, :

-against- :

HOWARD H. CALLAWAY, as Secretary of the Army, et al., :

Defendants. :

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STATE OF CONNECTICUT)
: ss.:
COUNTY OF NEW LONDON)

HOWARD MICHAEL WEISS, being duly sworn, deposes and says as follows:

1. This affidavit is submitted on the request of the plaintiffs Natural Resources Defense Council, et al. in support of their motion for a preliminary injunction to keep the Navy from dumping up to 2.8 million cubic yards of Thames River sediments into Long Island Sound at the so-called New London Dumping grounds. This affidavit is directed to the potential consequences of the dumping and the deficiencies which attend the Navy's analysis of the proposed action. In general, it is my opinion that the dumping could have serious and adverse long-range impacts on the Sound and its resources, especially if, as

appears to be likely, the sediments are spread by the currents.

Qualifications

2. My qualifications are as follows. I received my Bachelor of Arts degree in General Science and Physics from the University of Rochester in 1964, my Masters in Science Education and Biology from Harvard in 1965, and my Doctorate in Zoology and Marine Ecology from the University of Connecticut in 1970. From 1965 to 1967 I taught biology at the high school and college levels. I then served as Research Assistant at the Marine Research Laboratory, University of Connecticut, in Groton, from 1967 to 1970. From 1970 to 1972 I was Director of the Windward Oceanography Institute in Norwalk, Connecticut. During 1972 I also served as Temporary Executive Secretary of the Research and Planning Advisory Committee, Long Island Sound Regional Study, New England River Basins Commission. Since 1972 I have served in my present capacity as Director of Project Oceanology, Avery Point, Groton, Connecticut, a marine research and education center serving 14 school districts in Southeastern Connecticut. I am also a member of the adjunct faculty of Eastern Connecticut State College.

3. In the last three years I have been appointed to a number of Federal and State Committees concerned with marine ecology, including, in 1971, the New England River Basin Commission's Interim Research and Planning Advisory Committee for the Study

of Long Island Sound; in 1973-74, the Citizens Advisory Committee for the same Study; in 1972-73, the Connecticut Commission for Coastal Zone Management; and in 1974, the Town of Groton Conservation Committee. I am also a member of several professional societies, including the American Association for the Advancement of Science and the American Institute for the Biological Sciences; have been the recipient of a number of awards and grants in the fields of marine biology and ecology; and have published four papers, including two dealing specifically with Long Island Sound and its marine life.

4. In terms of the specific proposal here involved -- to wit, the dumping of nearly 3 million cubic yards of sediment dredged from the Thames River into Long Island Sound approximately one and a half miles off shore -- I have, in the course of my Directorship and otherwise, made frequent surveys of the Thames River and the area of the Sound where the dumping is proposed. As a result of this work, which has included, among other things, trawlings, bottom grabs, corings, plankton tows and analyses of water chemistry, I have become personally familiar with the nature of the materials to be dredged and the marine environment where the sediment would be discharged. In addition, I have reviewed in detail both the Revised Draft and Final Environmental Impact Statements issued by the Navy, including the results of the limited studies it made; and I have also examined the criteria that have been developed as a part of the proposed

monitoring program -- supposedly to give warning of any impending disaster. Unfortunately, as noted below, they will tell us nothing about the long-term, and that is where the real problem lies.

The Problem of Dumping

5. To understand the problems posed by the dumping, it is first necessary to understand the nature of the dump site and the marine life that inhabits and surrounds it. In this connection it is essential to understand at the outset that the eastern end of Long Island Sound, and particularly those waters in proximity to the New London dump site, are rich in many different forms of marine life. Some 28 different benthic, or bottom-dwelling, organisms are, for example, listed in Table 9 of the impact statement. Many finfish also inhabit this part of the Sound and the surrounding rivers and estuaries, as noted in Tables 10, 11 and 12. In addition, the dumping site and the surrounding areas are inhabited by crabs, lobsters and a variety of shellfish, including mussels and soft and hard shell clams which are found in abundance. The Niantic Bay scallop, which had almost disappeared, has also been brought back in surrounding areas through careful marine planning and management. While the New London area is not unique throughout the Sound in terms of supporting a rich marine fishery, the waters, tidelands and estuaries contiguous to the dredging site constitute a marine habitat of great importance for the spawning, development, sus-

tenance and overall survival of many different and important fish and shellfish.

6. It is also important to understand that the marine life potentially affected by the dumping and any resulting dispersal of pollutants is not limited to inhabitants found at any particular time at the site itself. For example, many of the ocean species of fish found in the area spawn in the esturian regions of the coast and move gradually offshore in the course of their juvenile development. Here they either develop or are preyed on by other predator fish up the food chain. To the extent that they have ingested or otherwise been affected by waters containing pollutants from the sediment, the impact can thus expand geometrically. In the same fashion lobsters forage along the bottom for crabs and a variety of other living organisms which, to the extent they have absorbed the pollutants by ingesting species lower on the food chain, will then pass these on to the lobsters. Shellfish such as clams and mussels are likely to concentrate pollutants <u>directly</u> through filter feeding.

7. As another example of the variety of life that could be affected by the dumping, the more open waters of the Sound in this area constitute important habitats for schools of manhaden. These fish are important commercially and are caught in numbers by seiners within the dump site itself and in surrounding areas. These bait fish are also critical to the development of bluefish

and striped bass. From tagging experiments, for example, we have discovered that bluefish can literally double their weight within a month when feeding from schools of manhadden which inhabit these waters. Here again, of course, the release of pollutants from the dredged sediments could be taken up by the fish and concentrated further up the food chain.

8. The sediments themselves, which are to be dredged up from the bottom of the Thames River after being laid down over a number of years, by man-made as much as natural deposits, are, of course, the immediate source of the danger. From my personal observations and analyses, it is apparent that the river bottom sediments are highly organic and oxygen depleted, and contain residual sewage wastes, heavy metals and deposits of oily residues. In a number of places, the bottom is also rich in hydrogen disulfide, indicating anaerobic (or oxygen poor) mud and bottom conditions. As a result, the diversity of marine organisms living in the bottom muds of the river is much lower than those found in more oxygen rich muds farther out in Long Island Sound.

9. My personal observations are substantiated by the data set forth in the Final Environmental Statement which reveals that at most of the Thames River points, or stations, where samples were taken [Table 2, p. 40], the Environmental Protection Agency criteria defining permissible levels of contaminants were exceeded in one or more of the following categories: vola-

tile solids, chemical oxygen demand, nitrogen, lead and zinc. In addition, the data set forth in Table 6 of the Impact Statement (p. 50) show that the bottom sediments contain high levels of fecal coliform, total coliform, fecal streptococci, and staphylococci, all of which are associated with human wastes, at one or more of the stations sampled. In short, the sediments are polluted.

10. The foregoing are the type of materials that would be discharged into the Sound if the dumping goes forward. The Navy has recognized that these could create problems, but it has largely dismissed them on the grounds that they will be contained within the immediate dumping area and should not do much damage nearby. This, however, is, in my judgment, to mistake the character of the dumping grounds, and it is also to ignore the potential for serious long-term damage.

11. With respect to the dumping grounds, both my personal bathymetry and the Navy's limited studies (NAVOCEANO TECHNOTE 7300-3-73, set forth as Exhibit J to the Final Impact Statement) show very clearly that the dump site is a relatively shallow basin, with a depth of only 35 feet at one point and a maximum depth of only 80 feet. Overall, about one-third of the site is shallower than 65 feet, and this means the deposited silt will not be at great depths. To compound this situation, my personal observations of the dump site (as well as the Navy's technote) reveal that the site is subjected to significant currents, which,

at varying phases of the tidal cycle, flow towards Niantic Bay, the New London shoreline (including Ocean Beach State Park), the Thames River, the State Park at Bluff Point, Groton and, one mile to the east, Fishers Island. Areas affected by the currents flowing across the dump site also include, as I have previously indicated, many valuable coastal resources, as well as marine fisheries (lobster, flounder, etc.) and sport fishing areas (e.g., bluefish and striped bass).

12. Despite all of the potentially affected areas, the Navy and Army have disclaimed the likelihood of damage on the theory that the polluted spoil will sit still. In this connection, they appear to rely exclusively on very limited studies made at the dump site in 1972, which showed currents of no more than 38.6 centimeters per second, or about three quarters of a knot. However, these measurements were made on June 20-25 and August 2-16, 1972, during periods of apparent optimum weather and low energy current conditions. The measurements, therefore, do not reflect high energy currents associated with autumn and mid-winter storms. Studies elsewhere have shown that storm conditions generate the bulk of sediment transport likely to occur within a year. I would expect that in similar storm conditions in the New London site there would be significant movement of the polluted sediments beyond the site and into valuable coastal areas. In this particular instance, moreover, given the exposed nature of the dump site, the normal low energy currents may also

be capable of conveying the polluted dredged spoils on a regular basis into the coastal areas and ultimately further into Long Island Sound, reflecting the westerly nature of the daily residual drift (net current effect). Additionally, since the dump site is located close to areas of extremely high energy currents such as the Race (about 5.2 knots), even further dispersal may be likely.

13. In summary, based on my personal observations and review of such studies as have been made, I have serious reason to doubt that the New London Dumping Ground can be characterized as a containment site which, as noted in the EIS, is critical to the dumping here proposed. Instead, it appears that dispersal of the polluted sediments is more likely and, as such, the risks of damage are serious indeed.

Impact

14. There is no reason to assume that catastrophic environmental consequences such as massive fish kills will result from dumping at the New London site -- over the short term. The greater concern, and real danger, lies in the long-term exposure of marine organisms to the polluted dredge spoils, particularly if, as is likely, dispersal of these materials occurs.

15. One potential long-term consequence of the dumping

is heavy metal uptake by successive links in the food chain. Studies indicate that heavy metals such as those admittedly present in the Thames River sediments are taken up by marine organisms and concentrated at each successive link in the food chain, resulting in contamination and the depletion of healthful resources. Here, with the close proximity of important spawning and nursery areas, the natural predation that occurs in these areas and offshore, and the large number of bottom feeding and filter feeding organisms, this presents a significant risk. In addition, the presence of coliforms in the Thames River bottom muds could indicate pathogenic organisms (bacteria and viruses) to which fish and shellfish may be susceptible. In this connection it should be noted that while shellfish are found living in the Thames River, the harvesting and consumption of these creatures from the River are prohibited because of the pathogenic bacteria which are present and which constitute a health hazard to humans. Obviously, dispersal of the River's polluted dredge spoils over a much greater area could similarly jeopardize these important species and food sources for thousands of people along the coast. And added to this is the fact that siltation of sediment over the shellfish beds could result in suffocating these creatures.

16. It also bears noting that environmental insults are synergistic and cumulative in their effect -- a factor that has been ignored by the Navy, which takes the dumping as if it were to occur in a vacuum. But there are other sources of pollution around, such as industrial effluents, municipal wastes and, all too likely, future dumping of additional dredged spoil; and when the magnitude of the New London dumping is considered in conjunction with these others, it may well be that the overall harm will be seriously compounded. This, however, has simply not been addressed.

17. I also note that the monitoring program that has recently been approved offers very little in the way of protection. Aside from the ambiguousness of the criteria for measuring effects, the more pertinent fact is that the monitoring program is of such a limited and short-term nature that it is very unlikely to uncover any long-range detriments and seems designed to detect only catostrophic near-term consequences. At best, I fear, it will simply record history; and when the damage is done, it will already be too late.

Conclusion

18. In summary, it is my opinion that the New London Dumping site chosen for spoil disposal is not a containment site, and that

dispersal of the polluted dredge spoils is probable under high energy storm induced currents and may even occur during normal current conditions. Further, while catastrophic short-term damage may not be likely, there are very real risks of long-term harm, of a type that would not be detected through the proposed monitoring program. In view of these dangers, I believe it highly improvident to undertake dumping at New London, in such close proximity to so many important coastal and marine resources.

Howard Michael Weiss

HOWARD MICHAEL WEISS

Sworn to before me this

16th day of August, 1974.

Lucy A. Crowley

Notary Public

Exh. 17

Mr. Andreliunas/mep/320
27 June 1973

DRAFT

SUBJECT: Long Island Sound Dredging and Dumping Status Report

TO: Division Engineer

1. The purpose of this memorandum is to report on the status of our activities with regard to resolution of several outstanding questions regarding dredging and dumping in Long Island Sound. There are ~~two~~ three matters involved which are of current interest: (1) That of the proposed dredging by the Navy of 2.9 million yards in New London Harbor, and (2) the general matter involving the use of dumping grounds generally for Corps work and for private work. (3) The LIS study with reference to critical problems reports.

2. On the 4th of June I met in OCE with the Chief of Operations and members of his staff and with representatives of the Naval Facilities Engineering Command in Washington to discuss the proposed dredging at New London. At that time, the Navy had released a draft impact statement which specified that the dumping would take place in the Newport dumping ground. We had, previous to this, advised the Navy that the selection of this dumping ground for the New London work could not be substantiated and that the overall responsibility for assignment of dumping grounds is vested in the Corps of Engineers. I agreed at this time that the Corps of Engineers would select

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dump sites and advise the Navy of such selections within the shortest possible time and that it would be expected that the Navy would agree to support their dumping activities with monitoring and research projects which we would mutually agree to. Following this meeting, the Navy announced that it had postponed hearings on the impact statement which had been scheduled for 14 and 15 June. We were further advised that the Navy would offer us full cooperation in pursuing the matter of dump site selection and attendant work.

3. On the 19th of June, Carl Hard and I met with Jack Pearce of the NOAA Sandy Hook Laboratory and Jan Prager of the EPA Kingston Laboratory at Newark, New Jersey to discuss a proposal which we had drafted concerning the dump site selection for the Navy work. Dr. Pearce is the Chairman of the Scientific Advisory Subcommittee on Dredging and Disposal. A copy of my draft and a copy of Dr. Pearce's memo of the meeting are attached (Encl 1 & 2). It is significant to note that there is little said about the scientific aspects of the overall proposal and that the scientists seem to be relying heavily on public involvement to solve what is at the present time necessarily a political problem.

4. On the 26th of June, Morgan Rees and I met in Hartford with Zel Steever, Peter Riley, and Bob Moore of the Connecticut

DRAFT

Department of Environmental Protection and Lt. Ted Way and Jerry Rogers of the Navy (Northern Division, Facilities Engineering Command, Philadelphia). At this meeting, I explained to the two parties the Corps' proposed plan for meeting the Navy dumping ground requirements and informed them that a rough timetable for subsequent action would be as follows:

Within a week, Mr. Hard would submit to the Subcommittee Chairman the framework for required monitoring and research in connection with the Navy project. ~~This would be coordinated for the most part by phone, with a meeting if necessary.~~

Following this, we would strive to convene a meeting of the Sub-Committee, Navy, and State, ~~Regional Coordinating Committee~~ with the target date of July 13 in order that the principals in the agencies might be advised of the proposed plan and of the Scientific Subcommittee's recommendations.

Following this, the next step would be for the Navy to agree on the scope of work and funding involved and the Corps would issue Public Notices on the application, followed within a short time by Notices for Public Hearings.

5. There are many factors involved in reaching our decision on this course of action, and it is extremely difficult to predict what reaction will be produced. Consideration of the New London site

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for dumping is based on economics, on rather sketchy information regarding sediment transport and on the fact that it has previously been used for this purpose. Against this we have weighed the impact of establishing a new dump site outside of Long Island Sound in an area on which less physical data is available and in which there is bound to be a heavy commercial fishing involvement. The research program will encompass ~~the~~ physical studies of areas outside the Sound, with particular attention being given to evaluation of fisheries activity. As it now stands, I anticipate that the most vocal opposition will arise as a result of the general hysteria which has existed over the whole dirty business of dumping in the ocean.

6. On the other matter, it is worthy to note that the State of Connecticut has enacted legislation recently which gives the State permit authority over non-Federal dumping as well as dredging and general construction activities. The need for the State to establish designated dumping grounds which are mutually acceptable has become apparent and quite urgent in that there are a substantial number of permits pending before the State. In order to stimulate discussion on this matter, we presented the attached proposal (Incl 3) for the State's consideration. One interesting point which arose during the discussion was that the New York District was desirous of also

continuing to issue permits for dumping in the Sound and the possibility was brought up of using the Eaton's Neck dumping ground in lieu of Stamford and Bridgeport. We left this as a matter to be worked out between Connecticut and New York State. My latest information is that it will take a while. However, when resolved ~~they are still working on it and, as it now~~ it appears, the following dumping grounds will be utilized for all activity in Long Island Sound:

New London

Cornfield Shoal (Mouth of Connecticut River)

New Haven

Eaton's Neck

The D.E.P. has drawn ~~proposes to draw~~ up a Memorandum of Agreement to this effect to which the Corps, New York State, EPA and Conn. D.E.P. would be signatories. eventually.

(For these permits which come up in the interim, we will utilize Stamford and Bridgeport instead of Eaton's Neck)

7) ~~3 Incl~~ ~~As stated~~ See following sheets

Copies to:
Ciccone
Leslie
Reese
Guptil
IGNAZIO
Bergen
Bonyiasi
Sullivan
McCarthy

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Exh. 20

A PROPOSAL FOR AN ENVIRONMENTAL SURVEY OF EFFECTS OF DREDGING AND SPOIL DISPOSAL IN THE THAMES RIVER AND NEW LONDON DUMPING GROUND

submitted by the

Middle Atlantic Coastal Fisheries Center
National Marine Fisheries Service
National Oceanic and Atmospheric Administration
U. S. Department of Commerce
Highlands, New Jersey 07732

to

U. S. Army Corps of Engineers

May 21, 1974

The State University of New York at Stony Brook (SUNY) has also been collecting information on the waters of eastern LIS as part of a larger survey of baseline hydrography throughout LIS, begun in 1969. Measurements have included temperature, salinity, dissolved oxygen, nitrates, nitrites, phosphates and chlorophyll A (Hardy, 1970). Investigation of ammonia levels was added in 1970 (Hardy and Weyl, 1970; Hardy, 1972a). The survey was extended into BIS in 1971, and determinations of urea were included (Hardy, 1972b). SUNY has also been conducting research, perhaps relevant to the present operation, on the physical and chemical properties of dredged waste from the New York area (Gross, 1970; Gross et al., 1971). Gross and Bumpus (1972) completed a seabed drifter study of residual near-bottom drift in LIS in 1969. They agreed with Riley (1952, 1956) that a two-layer flow was present at the eastern end, with low-salinity surface waters moving seaward and being replaced by more saline bottom waters. The probability was considered high that spoils deposited in the eastern end would undergo resuspension and movement (Gross and Bumpus, 1972).

The University of Connecticut (UConn) has recently begun a series of investigations aimed at determining budgets for heavy metals in LIS waters (Dehlinger et al., 1973). Studies to date have concentrated on eastern LIS. Some preliminary conclusions bear directly on any proposed study of spoil disposal off New London.

Circulation patterns near the Race were held to be much more complex and variable than originally proposed. Current measurements indicated a large counter-clockwise gyre between the Race and Plum Cut in eastern LIS, suggesting renewal of these waters in 3-7 days. This dynamic regime would hinder the effectiveness of concentrating mechanisms such as biological uptake and incorporation.- thus the area would not function as a sink for heavy metals or other contaminants. Suspended matter concentrations were higher in bottom waters, and were strongly affected by storms. UConn's investigation of concentrations and forms of metals in LIS waters is also very pertinent to the present dredging-disposal studies.

Little information is available on sediment characteristics or benthic biology at the actual dredge and dump sites. The University of Connecticut has been examining the benthic macrofauna, particularly molluscs, of nearby Fishers Island Sound. The Middle Atlantic Coastal Fisheries Center, NMFS, has sampled several stations in the disposal area as part of a baseline survey of sediment and benthic macro- and meiofauna throughout LIS.

The only intensive sampling in the disposal area is that conducted by NAVOCEANO to determine the effects of a much smaller disposal operation in 1972-1973 (Naval Oceanographic Office, 1973). This study measured the effects of dumping approximately 92,500 cubic yards of spoil (from a pier construction site at Groton) on the

New London dump site. Surveys were made before, immediately after and six months after the dumping operation. NAVOCEANO recorded bathymetry and currents; salinity, temperature, dissolved oxygen, nutrients, heavy metals and light transmittance of the water column; and sediment grain size, carbonate, organic carbon, Kjeldahl nitrogen, heavy metals, volatile solids, oil and grease, BOD, bacteriology and benthic invertebrates.

It was concluded that the relatively small volume of spoil had little effect on the dump site's bathymetry. Current directions and speeds were such that resuspended sediment would undergo only limited net transport away from the site. Any impact of disposal on water column parameters were obscured by the much larger effects of Hurricane Agnes during the pre-disposal phase. No statistically significant changes were found in sediment grain size, organic carbon, nitrogen, heavy metals, volatile solids, grease and oil, BOD or coliform counts. Faunal densities were reduced immediately following dumping, but showed a marked recovery six months later.

The NAVOCEANO survey generated information of value in establishing baselines for the present operation and in designing an adequate survey to determine dredging-dumping effects. However, an intensive pre-during-post dredging survey is still deemed necessary. The volume of spoil to be dumped is approximately

30 times that of the NAVOCEANO study, so their finding of little environmental perturbation may not strictly apply to the larger project. Also, it is felt that several portions of the NAVOCEANO investigation (effects on water column exotics, plankton, benthic macrofauna) would have to be much expanded to document impacts with any certainty.

Exhibit 23

UNITED STATES DISTRICT COURT
DISTRICT OF CONNECTICUT

NATURAL RESOURCES DEFENSE COUNCIL, et al., Plaintiffs,	:
-against-	:
HOWARD H. CALLAWAY, as Secretary of the Army, et al., Defendants.	:

STATE OF NEW YORK)
: ss.:
COUNTY OF SUFFOLK)

EDWARD R. BAYLOR, CHARLES D. HARDY, JOEL S. O'CONNOR, and C. DONALD POWERS being severally sworn, do each depose and say as follows:

1. This affidavit is submitted at the request of the plaintiffs in this action in support of their motion for a preliminary injunction against the Navy's proposal to dump 2,800,000 cubic yards of Thames River bottom sludge into Long Island Sound approximately one mile to the west of Fishers Island, New York and one and a half miles south of the Connecticut shore. This affidavit is directed to the serious environmental consequences of the dumping, as we see them, and the inadequacies of the Navy's efforts to justify the proposal. It is our opinion, as set forth in greater detail below, that disposal of the polluted spoil at the proposed New London Dumping grounds

would have a severe impact on the ecological health of the surrounding waters and, in the long-term, threatens seriously to degrade the biological integrity of Long Island Sound and to impair its ability to support a diverse and healthful community of marine li[illegible].

Qualifications

2. Our respective backgrounds and qualifications are as follows:

A. Edward R. Baylor.

Ph.D. in Physiology, Princeton University, 19[illegible]9
Asst. Prof. Zoology, Univ. of Michigan, 1949-1957
Resch. Scientist, Woods Hole Oceanog. Inst., 1957-1963
Assoc. Scientist, Woods Hole Oceanog Inst., 1963-1968
Prof. Biol, State Univ. of New York at Stony Brook
Prof. Biol. Oceanogr., Marine Sciences Research Center, SUNY at Stony Brook, 1968 to Present.

Research and publications on the ecology, physiology, and behavior of zooplankton 1949-63. Research and publications on dissolved and particulate carbon in sea water, 1963 to present. Research and publications on the physical and statistical distribution of zooplankton in the ocean, 1965 to present. Supervised biological, geological and oceanographic survey for ocean outfall to service South West Sewer District #3, Suffolk County. Co-director with Professor C. D. Hardy of a similar survey for Nassau County. Co-director with Professor C. D. Hardy of two surveys to establish surface and bottom H_2O circulation in New York Bight.

B. Charles D. Hardy.

My qualifications are as follows: I received my B.A. degree in Biology from Boston University in 1956 and a Masters Degree in Biology from Cornell University in 1962. In addition, I have taken courses in Radiation Biology and Physics at the University of New Mexico, 1965, and Phytoplankton at Hopkins Marine Station, 1967. From 1962 to 1969, I was an Associate Professor of Marine Technology at Suffolk County Community College where I developed training programs for marine technicians. From 1969 to the present, I served as a research associate and presently Assistant Research Oceanographer at the Marine Sciences Research Center, State University of New York where I have participated in research concerning the movement and quality of water in Long Island Sound. I have presented numerous papers and written 5 technical reports of the water properties and circulation of Long Island Sound. I belong to a number of professional societies concerned with the marine and environmental sciences.

C. Joel S. O'Connor.

My qualifications are as follows: I received my B.S. degree in Fisheries Biology from Cornell University in 1958, and Masters and Ph.D. degrees in Oceanography from the University of Rhode Island in 1961 and 1965, respectively. From 1965 through 1968 I was in charge of computer operations contributing to technical information handling (largely "literature retrieval") for the U. S. Atomic Energy Commission, and did research on mathematical models in aquatic ecology. From 1968 through 1971 I was Senior Research Associate in the Biology Department, Brookhaven National Laboratory, Upton, N.Y., where I designed

and carried out an estuarine research program with primary emphasis upon environmental stresses and the structure of benthic invertebrates. From 1970 to 1973 I was a Visiting Investigator, Systematics Ecology Program, Marine Biological Laboratory, Woods Hole, Massachusetts where I participated in a synthesis of benthic ecology data gathered over several years in Cape Cod Bay. From 1971 through 1973 I was Visiting Associate Professor and Research Associate, Marine Sciences Research Center, State University of New York, Stony Brook where I carried out a number of studies in estuarine and coastal zone ecology and did graduate-level teaching. Since 1973, I have been an Oceanographer for the New York Bight Marine Ecosystems Analysis Project of the National Oceanic and Atmospheric Administration, being responsible for the planning and administration for ecological research. I have published 15 papers and reports on estuarine and coastal zone research, and belong to seven professional societies concerned with the aquatic sciences.

It must be clearly understood that my testimony and other activities in connection with this proposed action are given as an individual, not as a representative of or spokesman for my employer, or on behalf of any group.

D. C. Donald Powers.

My qualifications are as follows: I received my B.S. and M.S. degrees in Microbiology and Public Health from Michigan State University in 1961 and 1965, respectively, and the Ph.D. degree in Epidemiologic Science (dissertation research: biochemistry of virus infections) from the University of Michigan in 1969. From 1969 to 1972, I was a research fellow sponsored by

the National Institutes of Health in the Department of Microbiology, Cornell University Medical College, New York City. My research there involved the ecology of arboviruses in Central America with emphasis on the role of wild birds and mammals as potential arbovirus hosts.

My concern over environmental degradation led me to seek a position in 1972 wherein I could apply my knowledge of microbiological techniques to the analysis and, hopefully, the eventual solution of certain environmental problems. The opportunity arose in the microbiological laboratory of the Marine Sciences Research Center, State University of New York, where I am currently employed as Research Associate and Project Director. Our primary concern has been the effect of persistent pollutants on pure cultures of marine phytoplankton and, in the near future, we shall include zooplankton and natural plankton communities. Our studies so far have utilized several chlorinated hydrocarbons (DDT, DDE, PCB and dieldrin) and various species of marine diatoms and dinoflagellates.

I have published four technical papers with one currently in press and two in preparation. In addition, I am a member of three professional societies.

3. Together, we have reviewed in depth the criteria for monitoring Thames River Dredging approved by Army Engineers issued on August 8, 1974 as well as both the Revised Draft Environmental Impact Statement issued by the Navy in late May 1973 and the Final Environmental Impact Statement issued in December 1973, including the results of the limited testing upon which the Navy purports to justify the dumping proposal. In

addition, through our collective experience, we are broadly familiar with Long Island Sound and its environment, having spent many combined years studying its parameters. We are thus in a position to evaluate the Navy's proposal against a background of many years work in assessing the resources and physical, chemical and biological parameters of the Sound, as well as the impacts of man upon it.

4. The specific proposal here is to dredge 2.8 million cubic yards (i.e. about 78,000,000 cubic feet) of sediment, or muck, from the bottom of the Thames River, where it has collected over many years, haul it by barge offshore of New London and the Connecticut coast, and there -- about a mile and a half out -- dump this spoil material in Long Island Sound over an area approximately one mile square. Needless to say, where the sediment is actually dumped, bottom life is going to be smothered and largely destroyed; but that is by no means the limit or, indeed, the major parameter of the problem. The more serious concerns are the outfall of polluting matter from the muck; The potential of its spreading, due to ocean currents, over a much broader area of eastern Long Island Sound; and the ultimate taking-up of the pollution into the food chain, including, ultimately, man's food chain. All of this would have severe consequences.

5. In an effort to defend against these problems, the Navy has undertaken limited preliminary studies and has agreed to finance an extensive monitoring program in connection with the dumping. However, the studies themselves, as noted below, were and are virtually meaningless, and there is little to

indicate that this monitoring program is much more than for purposes of measuring history. There is, for example, no commitment that the Navy will in fact stop if applicable criteria are violated. Far more importantly, the proposed monitoring is neither designed to, nor capable of, measuring degradation over the long-term and the resulting broadscale impacts of the polluted spoil on the Sound.

6. There are, in particular, two major deficiencies in the Navy's purported assessment of the likely impacts of the disposal operations. The first of these derives from the poor quality and inadequate analysis used to describe the chemical nature of the Thames River sediment. Commonly, the bottom sediment of an industrialized harbor, as at New London-Groton, would be expected to contain elevated concentrations of petrochemicals and heavy metals. In the case of the Thames River, the presence of radionuclides would be anticipated. Such substances have been routinely demonstrated to be biologically toxic or lethal at relatively low concentrations. No petrochemical measurements were reported in the Impact Statement. Trace metal analysis was limited to three elements, Hg, Pb, and Zn; and the methods of analysis used were not described. Only one radionuclide was measured, Cobalt-60, but only the abstract of the results of the measurements was submitted in the Impact Statement. Cobalt-60 hotspots of 297 picocuries/gm were reported, however. The chemical composition of the harbor spoil is a critical criterion upon which responsible environmental evaluations must be based. The data on sediment chemistry, as presented in the Impact Statement, are insufficient to form reasonable assessments of the potential impact of the spoil on marine

communities. In addition, as far as we are aware, no procedures have been established to screen the harbor spoil for the presence of excessive concentrations of toxic contaminants before dumping.

7. The second deficiency is concerned with an apparent conflict between the "Impact Statement's" conclusion that a dumping site which possessed hydrographic conditions which would allow the spoil to be contained was required in contrast to the dispersion-promoting oceanographic conditions actually existing at the dump site chosen. We will not labor the point here that the Navy, in the Final Draft Impact Statement (May 1973), concluded that a dump site in Rhode Island Sound was most suitable. For whatever reason, the Navy chose to substitute in the Final Impact Statement (December 1973), the nearest dump site immediately south of New London Harbor. Unlike the dump site in Rhode Island Sound, this area of eastern Long Island Sound is characterized by strong oscillating tidal currents and an irregular bottom topography which promotes active eddy turbulence. Such oceanographic conditions would be expected to disperse the spoil rapidly. As the bottom residual drift is westward, the resuspended spoil would move into Long Island Sound. However, the Navy failed to refute the substantiating evidence which led to their own initial decision to select the Rhode Island Sound location as the one best suited for spoil containment. Instead, the Navy applied the same argument to an oceanographically different site in eastern Long Island Sound. This vitiates the Navy's scientific basis for this decision.

8. The potentially dispersive character of the dump site in Long Island Sound makes virtually meaningless the monitoring program at the dump location purportedly for the purpose of detecting adverse environmental effects. If the spoil is dispersed from the dump site by the strength of the water motion, the adverse effects will not occur at the dump site but "downstream" over a potentially broad area.

9. We do not claim that the dumping of the Thames River spoil in eastern Long Island Sound will necessarily result in sudden catastrophic tragedies such as mass fish kills, severe oxygen depletions or elimination of benthic fauna near the dumping area. Such events can be detected by the monitoring program proposed. We are more concerned over the environmental effects which the limited and short-term monitoring program will not uncover. The most devastating impact of uncontrolled and prolonged ocean or coastal zone dumping, such as that involved here, is the subtle and gradual deterioration of the environment over a long period of time. The capture and biological concentration of contaminants such as heavy metals, radionuclides or specialized organic compounds, and the latent effects of eutrophication resulting from the release of nutrients contained in the harbor sediment, require time. Thus, the adverse impact of dumping will lag behind the contaminating event and will likely occur at some distance from the point of release. By gradual degrees, however, the water quality is impaired and the biological community structure changes. It becomes impossible to fix an exact cause to the deterioration because of the dispersion of the pollutants from point of discharge and the incremental contribution of other dredging projects in the

region, but it is a consequence that we have seen for many years now from other projects, and it is a consequence that, in our opinion, can not be avoided here if the dumping of so much polluted spoil goes forward in Long Island Sound. It is this gradual deterioration which most effectively destroys the regional quality of the marine environment, yet is largely immune from detection by the type of monitoring proposed here.

10. We believe, generally, that because of the severe consequences that are likely to follow from the dumping of dredged spoil in massive quantities such as those involved here, a moratorium should be imposed on all further harbor dredging projects until (A) standards and methods of procedure are established to ensure a thorough evaluation of the sopil to be dumped and (B) studies and planning are initiated for Long Island Sound dredging and spoil disposal that will assess these activities as part of a regional problem rather than a series of troublesome local events. In this case, however, the Navy has claimed that the dredging is required by national defense considerations. If such is, in fact, the case and time is urgent as the Navy claims, there is some justification for allowing the dredging to proceed without as much information as would otherwise be required. There is not, however, any justification

whatever, in our opinion, for using the New London Dumping grounds as the dumping site for the polluted spoil. The risks to the marine environment and the long-term health of Long Island Sound are simply too great to justify such potentially disastrous action, and especially so where, as here, another site outside the Sound, at a location which the Navy and the Corps has previously found acceptable, remains available.

Edward R. Baylor
Dr. Edward R. Baylor
Professor of Biological Oceanography

Charles D Hardy
Charles D. Hardy
Associate Research Oceanographer

Joel S. O'Connor
Dr. Joel S. O'Connor
Oceanographer - NOAA

C. Donald Powers
Dr. C. Donald Powers
Research Biologist

Sworn to before me this 23
day of August, 1974.

Mildred C. Grauer
Notary Public

MILDRED C. GRAUER
Notary Public, State of New York
No. 52-5061540, Suffolk County
Term Expires March 30, 1976